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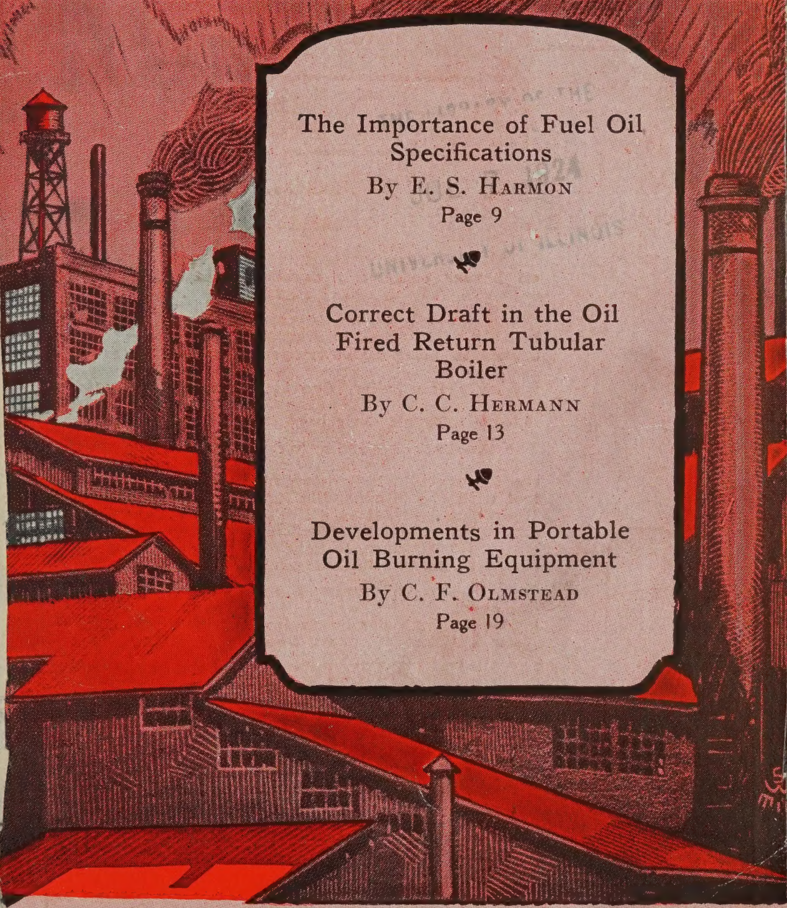

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The Importance of Fuel Oil Specifications
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Correct Draft in the Oil Fired Return Tubular Boiler
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Developments in Portable Oil Burning Equipment
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Vol. 3 JULY, 1924 No. 1

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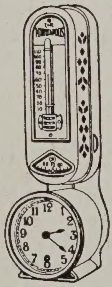

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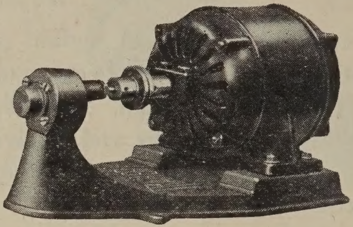

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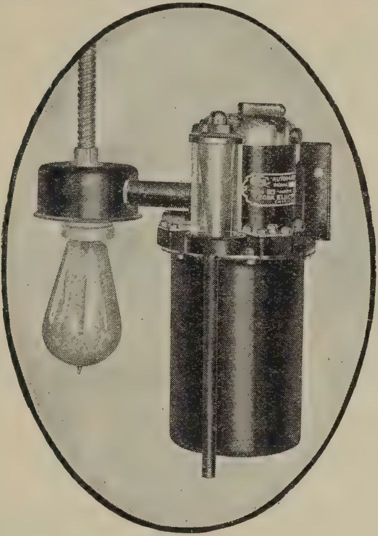

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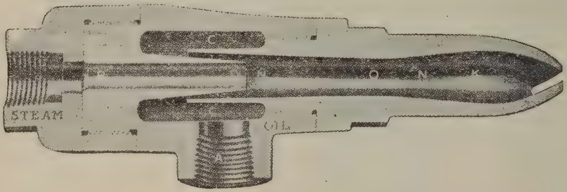

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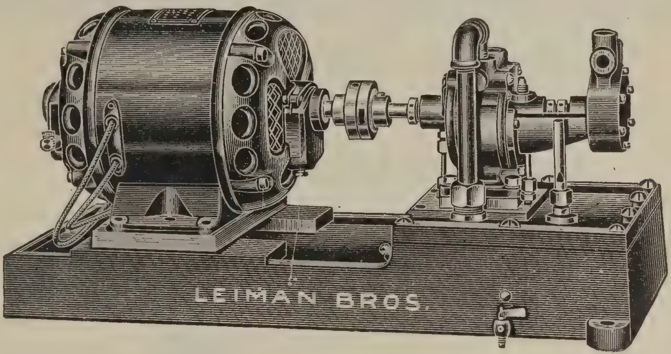
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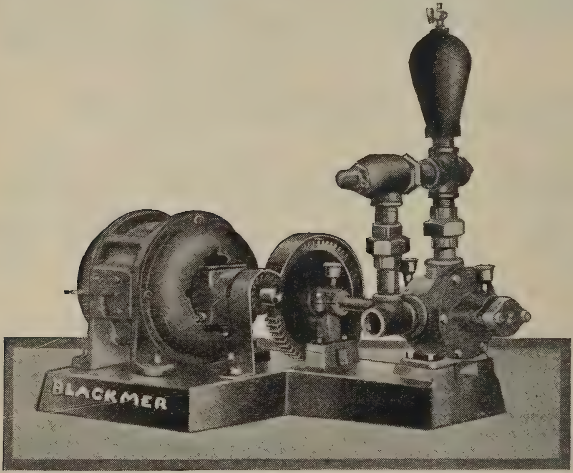

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Published Monthly

Vol. 3 July, 1924 No. 1

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The Importance of Fuel Oil Specifications

By E. S. Harmon *

EVER since the introduction of oil as fuel, the usual practice of plants desiring to construct an oil fired furnace, or convert a coal or gas fired furnace into an oil fired one, has been to depend upon the local talent within their own organization to do it. No attention is paid to furnace proportions, roof design, or method of applying the burner. The burner itself may be almost anything that will squirt the oil into the furnace without taking into consideration the quality or grade of oil to be handled. The oil systems, including piping and handling facilities, are installed with the view of minimum initial cost only, the grade of oil to be handled being lost sight of entirely. This method of procedure may have been the logical one in the days gone by when light oil was plentiful and cheap, but the increasing demand for lighter oils and the lower costs of the poorer oils has created the necessity of giving the fuel oil installation the same consideration as the coal fired installation.

Oil Has Advantage Over Coal

In the installation of a stoker and the construction of a furnace, the first question to be decided is the grade of coal to be burned, and equipment is installed to suit the grade of fuel available. Likewise, in proceeding with an oil fired installation, it should first be decided what grade of oil will be used and equipment installed accordingly. The installation of the oil system has one advantage over that of coal, in that the installation made to burn a heavy oil can always burn a light oil, while an installation made to burn coke braise or low volatile coal can not be successfully used with high volatile coal and vice versa.

With very few exceptions the oil system not installed or recon-

---

* Chief Engineer, Hughes and Company, Chicago.

structed within the past few years is not suited for handling heavier grades of oil. Consequently. whenever a car of oil is unloaded, which is a little heavier than ordinary, considerable difficulty is encountered in burning it. This has resulted in the setting up of specifications for oil purchases. In order to allow a safe margin between trouble and satisfaction, these specifications are generally drawn up considerably more rigid than necessary. Very few users of fuel oil realize what the governing factors are controlling the adaptability of the oil for their particular use.

The new users of fuel oil draw up their specifications to comply with those of a neighboring plant, without regard to difference in systems, reasoning that it is safe to follow the guidance of the plant with experience. Low sulphur content is quite frequently needlessly specified as it is not the formidable foe that many believe. Even in open hearth furnaces, where sulphur is one of the impurities affecting the quality of the steel, oil as high as 1½ per cent in sulphur content has been successfully used without affecting the quality.

Many owners of oil burning plants would save much trouble and dissatisfaction if, when their burner is being installed, they would familiarize themselves with fuel oil tests and the terms that are used in describing different oils. With such knowledge they could find the grade best suited to their burners or the burners best suited to the oils they intend to use, which, as the author points out, is a valuable finding. A cloud of misunderstanding seems to have settled over terms to identify oils, however, and many burner owners gamble instead of investigating.

Difficulties arising in burning oil are invariably due to the burner not atomizing the oil. It is more difficult to atomize heavy oil than light oil. Hence a plant burning a certain grade of oil keeps its burners in condition to burn that particular grade and thereby unintentionally and automatically sets up a certain standard in the degree of perfection to be maintained in its burning equipment. Consequently when a heavier oil is used, the degree of perfection of the burning equipment is not high enough to take care of that oil and it is condemned, and higher priced oil is again used. The cheaper method would be to raise the standard of the condition of the burners so that they would atomize the oil. This can be done very simply providing the oil is heated by placing the burner in the same mechanical condition it was originally intended to be.

It is not always necessary, in

(Continued on Page 72).

Electric Ignition and Control for Oil Burners

By J. C. Daley *

To the average reader there is no apparent reason why, if electricity can be used to ignite gasoline spray and vapor in automobiles, it cannot be used to ignite oil spray and oil vapor in oil burners. Electric ignition, according to Mr. Daley, will probably have to go through the same process of development in the oil burner that it went through in the automobile before it enjoys the same general use. Gas pilot-light ignition seems to be most popular at present, but a happy medium is drawn by many oil burners that use either gas or electric ignition or both.

THE farsighted burner manufacturer knows that his chief competition will come in the future. Burner design will then be far in advance of anything now in existence. Several years of use have proved that the automatic electric control and ignition for oil burners is very reliable, but it is to the electrical manufacturer and not the oil burner that we must look for development of this. The parallel existing between the oil burner industry and the automotive industry indicates quite conclusively that electric ignition for oil burners is sure to be generally adopted.

The purchaser of an oil burner has before him, not only the consideration of a possible economy, but also that of added convenience. From the fact that practically all burners at the present time are being made for adapting to designs of furnaces in which coal has been used as fuel, convenience rather than economy is the chief factor which is considered by the prospect for an oil burner. Without taking advantage of electric ignition and control, the burner industry would be in the same predicament that the automobile industry would have been in had automobile manufacturers been content to keep the "hot tube" type of ignition.

The buyer of a burner, while anxious to secure fuel economy, is usually far more interested in the promise of greater convenience and relief from burdens imposed by a coal burning furnace, and he is will-

(Continued on Page 66).

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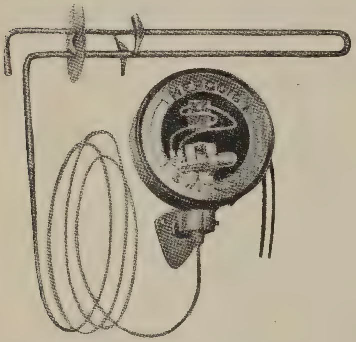
*Jefferson Electric Manufacturing Co.

New Control Prevents Overheating

Overheating of warm air domestic furnaces when using oil burners is guarded against by a recent addition to the line of the Federal Gauge Company, Chicago, according to a statement by J. W. Owens, sales manager. The new device is known as the Federal Mercoid Warm Air Furnace Control. The control is placed in the furnace dome, where it shuts off the burner when a 300 degree Fahrenheit temperature is reached, and starts it again when the temperature drops to 250 degrees. A mercury tube in the control is utilized to work the cut-off switch, the contraction and expansion of the metal causing it to form and break contacts with the two electric wires within the tube.



Federal Gauge Warm Air Furnace Control

Production of burners on a large scale will soon be started by the Super Oil Heater Company, Hartford, Conn.

Naval Consumption Increases

According to returns received by the American Petroleum Institute from the principal companies engaged in the marine fuel oil business, 63,129,137 barrels of fuel oil were delivered for ship's bunkers at United States ports and insular possessions in 1923, compared with 50,666,494 barrels in 1922, an increase of 12,462,643 barrels, or 24.6 per cent.

This is exclusive of fuel oil delivered to the United States Navy, which in 1923 consumed approximately 5,200,000 barrels, compared with 5,800,000 barrels in 1922, decrease of 10.3 per cent. This includes the Diesel oil consumed and all oil burned by the vessels but does not include the consumption at the yards and stations.

Of the total deliveries of 63,129,137 barrels to merchant vessels in 1923, 43,430,470 barrels were domestic fuel oil and 19,698,667 barrels were Mexican fuel oil.

Oil Engines Show Saving

At the Gaites and Peace Electric Lighting Fixture plant in Brooklyn, where there is a heavy demand for heating and process steam, oil engines are in use at present to produce power and it is estimated that ten tons more coal per month would have to be consumed to produce the same power by means of a steam engine. The fuel and lubricating oil for the engine now installed costs $52 per month as against $120 per month necessary for the extra coal. Central station current would cost $650 per month.

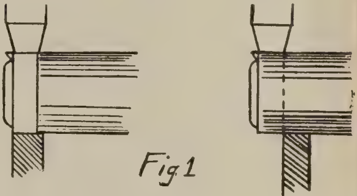
Correct Draft in the Oil Fired Return Tubular Boiler

By C. C. Hermann

THIS series of articles would not be complete without some reference to the smoke handling problem of boiler plants using the return tubular type of boilers as the steam generating units. An erroneous idea exists in the minds of many power plant engineers that by converting to the oil fired boiler all trouble with smoke and smoke ordinances is automatically eliminated. Not so, however, for smoke will issue from the stack just as dense and black under oil firing, unless proper management principles are exercised, as with the coal fired boiler.

Smoke is a problem of management and co-operation of the fireman. The products of combustion are much the same whether oil or coal firing is practiced. The transparent gas in either case is carbon-dioxide and when only this gas is emitted the maximum quantity of B. t. u.'s are exhausted from the fuel. When, however, the smoke emitted from the stack is dark, the products of combustion are principally carbon-monoxide indicating that approximately sixty per cent of the original heat value of the coal is going out of the chimney. The reason for this is excessive draft, too much green fuel or restricted air inlet below the grate.

With the oil fired furnace more attention must be directed to the matter of draft and proper losses through the setting than with coal, because economy is more easily effected. There are few grate losses or fuel bed losses in the oil fired furnace. In fact, the burners in many installations act as force draft appliances to a certain extent. The draft loss is principally confirmed to that through the boiler and uptake. These losses must be less in the oil fired setting on account of the pressure tendency of the burners. The height and diameter of the stack will therefore be less for the oil fired setting than for the coal fired setting.



The flush front type of setting has the front tube sheet about in the same vertical plane as the inside edge of the front wall shown in Figure 1, whereas, in the extended setting the smoke connection projects beyond the front wall.

As pointed out in a previous article, the extended front possesses the advantage of sealing the setting against short circuiting of the combustible gases from the combustion chamber directly to the smoke connection. This type of boiler has the disadvantage interfering with the extension of work around the front of the boiler. In the oil fired setting this objection is not serious.

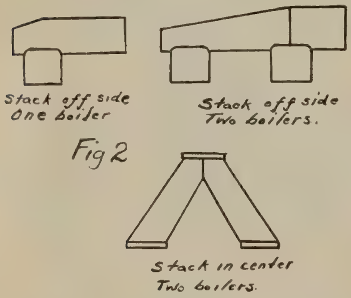


Fig 2

The Hartford Steam Boiler Inspection and Insurance Company recommend the following dimensions for the smoke connection.

Dia. of Boiler	Uptake or smoke opening Width	Length	Area (sq. in.)
54″	10″	3′4″	400
60″	10″	4′6″	540
66″	12″	4′6″	648
72″	14″	5′0″	840
78″	14½″	5′6″	957
84″	17″	6′0″	1224

These dimensions are not changed, generally, for oil fired conditions although present practice seems to indicate that the smoke opening could be made slightly smaller. The joint between the smoke opening and the breeching should be securely sealed with asbestos or other equally effective packing to prevent leaks. The breeching of the oil fired setting does not differ materially from that of the coal fired. It should possess an area at least ten per cent greater than the area of the stack at the top. The cross section of the breeching should be increased for each boiler connecting to it an amount equal in area to the smoke opening, and should taper back from boilers nearest the stack. A pressure loss of at least 0.05 inch of water should be allowed for each boiler connecting to the flue or breeching.

Flue Should Have No Turns

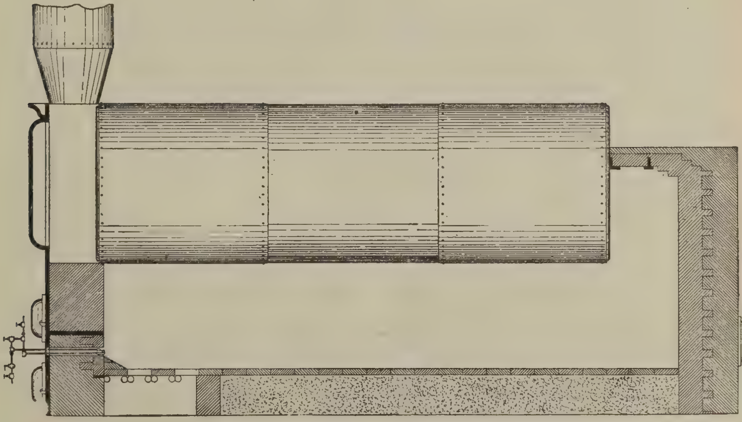
The flue should be as nearly devoid of turns as it is possible to make it and when a turn is necessary it should be a long sweep at least with a radius of one and one-half to two diameters at that point. It is advisable to cover the flue on the outside with some insulating material such as asbestos paper or magnesia covering. In Figure 2 are shown several methods of breeching for boiler settings.

The main object of the stack is to provide sufficient draft in the boiler setting, or in other words to cause the necessary weight of air to supply the oxygen of combustion to flow into the combustion chamber and not, as supposed by many, merely to conduct the gases of combustion to a certain height above the ground. The Hammel Oil Burner Equipment Company, in a test on a 171 horse power return tubular boiler using fuel oil gives the draft in uptake in inches of water as follows:

Test No.	Draft in up-take	Smoke	B. H. P. developed	Percent of rating	Ev. per lb. oil F & A 212	Efficiency per cent.
1	.0562″	None	121.25	70.65	15.79	80.30
2	.1756″	None	222.9	129.9	15.874	81.29
3	.2470″	None	253.3	147.6	15.75	80.68
4	.3547″	None	305.	177.7	15.49	79.29
5	.4200″	None	343.7	200.3	14.97	76.44

The draft in uptake was increased almost eight times for an increase of 130 per cent in rating. The above test was made by the Standard Oil Company at its Richmond (California) refinery. The boiler was equipped with one No. 4 Hammel oil burner and the furnace was of Hammel design.

The loss of draft through the boiler varies widely for different boilers, depending on the type and size of boiler, tube and baffle arrangement, setting design and rate of driving. Figure 3 shows the furnace to have no checker work, bridge walls or flash walls of any kind. Obviously the doing away with these reduces the expense and furnace upkeep. Sufficient volume and depth are obtained to insure complete combustion of the fuel before coming into contact with heating surface. The cost of changing over a coal fired boiler to this type of oil fired boiler is about one-hundred dollars for the setting changes and the price of the burner and regulator, which will average around fifty dollars.



Courtesy Hammel Oil Burning Equipment Company, Providence, R. I.

Fig. 3

Tank Standardization Progresses

Further progress toward simplification and standardization of tanks was made at a recent meeting in Chicago of representatives of tank manufacturers, equipment manufacturers of the United States and members of the Division of Simplified Practice of the Department of Commerce.

The following gallon capacities were recommended as standard for storage tanks, either above or below ground, for gasoline, oils and volatile liquids: 60; 220; 320; 550; 1,000; 1,500; 2,000; 2,500; 3,000; 4,000; 5,000; 8,000; 10,000; 12,000; 15,000; 18,000; 20,000; 23,000; and 25,000. It was decided, however, that a variation in actual capacity of not more than 5 per cent, either over or under the above figures, would be permissible.

The dimensions for tanks with the above capacities were not specified, although some of the manufacturers present asked for such procedure. It was decided to wait until a thorough study of the most satisfactory and most economical sizes could be made. Some of the suggestions were that dimensions calling for inches over the even foot should be avoided for tanks larger than 1,000 gallons; that the dimensions selected should be such as may be constructed with the fewest possible sizes of sheets; that all tanks with capacities of 5,000 gallons and larger should be equipped with a 14 inch screw manhole and a two inch air vent; and that outlets, two inches in diameter, should be placed in the bottom of the tank, opposite the manhole.

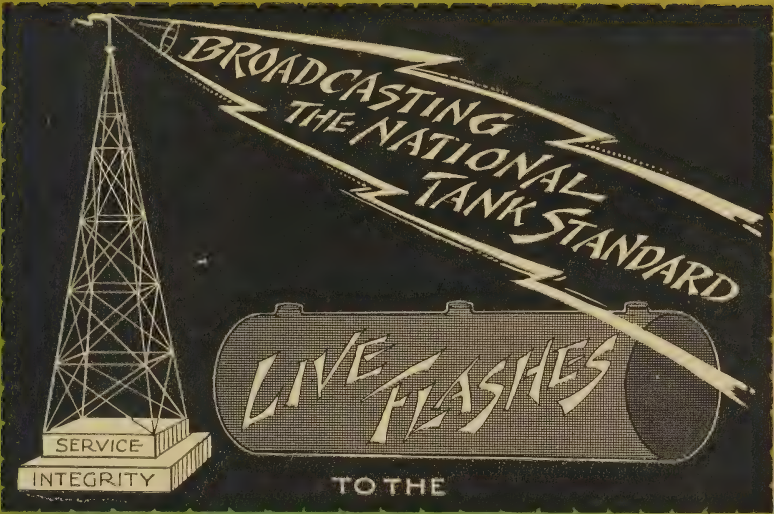
Fuel Costs Affected By Boiler Insulation

The Celite Products Company, Chicago, has just published several new bulletins on their products for the insulation of boilers and other heating equipment. Bulletin B-6e on "The Insulation of Boilers" describes in detail the method of insulating employed for various types and sizes of boilers, as well as figures on the fuel savings which can be realized by insulation.

Blue print Set B-16b contains charts on conductivities, as well as drawings showing the method of insulating various types of heated equipment. Several other bulletins have just been published, among them being Bulletin B-8d on "The Insulation of Industrial Furnaces and Ovens."

Describe Heavy Oil Burner

Recently a new pamphlet was issued by the Hydro-Carbon Burner Manufacturing Company, Newport, R. I., which described the Newport Rotary Oil Burner. Twenty economic, scientific and convenient reasons for using oil instead of coal are contained in the pamphlet together with illustrations of the Hydro-Carbon plant and the Newport burner. The latter is designed to handle heavy oils and a number of installations for such purposes have been made in the New England states.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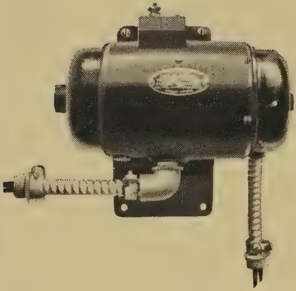

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The Honeywell Heating
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Wabash - Indiana

HONEYWELL
Temperature Regulators

Developments in Portable Oil Burning Equipment

By C. F. Olmstead, M. E. *

THERE seems to be a general lack of understanding in the commercial world as to what is included in the term "railroad and industrial oil burning equipment.' From observation it has been noted that this is largely responsible for the possibilities that are overlooked and the enormous waste every year in the shops and factories throughout the country by the use of obsolete methods and equipment. This experience leads us to carefully define our terms.

"Portable" is a relative term which in oil burning nomenclature is conveniently subdivided into "heavy portable" and "light portable." The heavy portable such as forges and small furnaces are supported on legs, and to suit the convenience of shop conditions, can be moved about on skids or picked up by a crane. This class is distinct from the permanent installations built from the floor up.

In the second classification is included such items of equipment as are conveniently carried in the hand or pushed and pulled on wheels. Torches and small rivet forges occupy the major part of this classification, but in it are included babbitt melting pots, small tool furnaces, brazing tables, asphalt heaters, and numerous others. In order not to unduly lengthen this discussion it will be confined to the light portable equipment only.

Vacuum Torch Lighting a Foundry Cupola

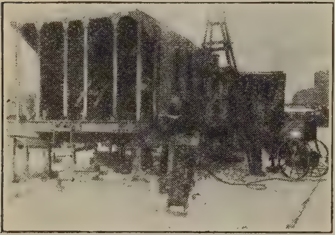
Hereafter a "torch" will be referred to as a portable device burning liquid fuel and producing a flame for heating purposes, carried in the hand and capable of being directed at will upon the surface to be heated. The term "burner" will designate a device used in a permanent position as for instance the heat producing unit on a forge or furnace. In the one combustion takes place in a cast iron or steel nozzle; in the other it is within a fire-brick chamber.

---

* Mahr Manufacturing Company, Minneapolis, Minn.

Read at the meeting of the American Association of Oil Burner Manufacturers.

There are certain advantages of oil burning equipment that are not comparable to any other. Torches are distinctly in a class by themselves. They offer no competition to other fuels with the possible exception of gas. We cannot conceive of a coal or coke burning torch! Even the mildest imagination can suggest a hundred and one uses for which torches are used daily. Every railroad, boiler, structural steel, machine and car shop, every garage, foundry, packing plant and factory, every contractor and steel fabricator should be using portable oil burning equipment. In all of these industries there is some operation or process where it is more economical to take the heat to the work rather than the usual reverse method of carrying the work to the heat.

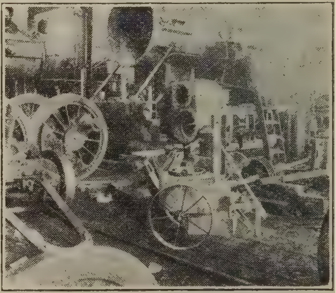


A Portable Rivet Forge for Car Repair Work

Consider, for instance, its use in a modern foundry. Core patches are dried, moulds skin dried, ladle linings dried and ladles heated, cupolas lighted, and castings preheated; all at a minimum of time, labor and expense. In the old days and at the present time in foundries where antique methods are still in vogue, it is customary to light the cupola by putting from 1/3 to 1/2 cord of wood in the cupola to ignite the coke bed. Wood is not only expensive to buy but also costly to handle. By properly laying the first layers of coke it can be quickly and uniformly lighted by the flame of a large torch—doing away entirely with wood and at an expense of only a few cents for oil.

In steel foundries ladles must not only have dry linings but, to obtain best results and reduce defective casting loss, must be heated. Heated ladles help to hold up the temperature of the steel until poured and ladles at high temperatures free themselves of slag which accumulates rapidly in cold ladles.

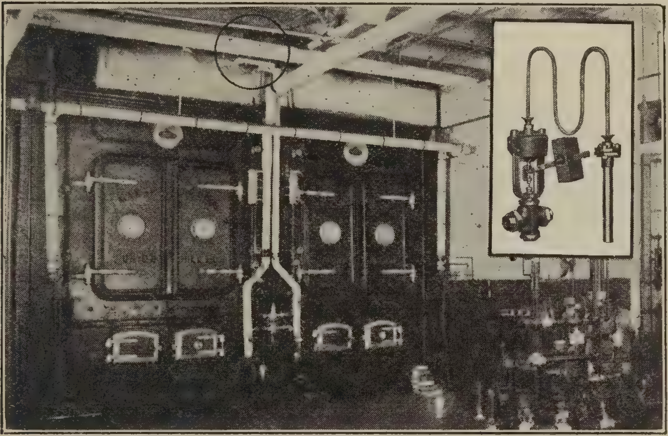
The common practice of drying linings is to build a wood fire in each ladle. Preparing kindling and building fires not only consumes considerable time but pieces of kindling are very apt to damage the soft lining.



A Babbitt Furnace on Wheels for Locomotive Repairs

Oil and gas fuel driers and heat-

Illustration shows Sylphon Temperature Regulator installed on Secondary Heater. The installation by Petroleum Heat & Power Co. is in a prominent New York City Hotel.



SAFETY is what Underwriters and Fire Boards stress *YOU* can get it in this easy way

Here is a Fuel Oil Installation that is safe. Safe, because in addition to the downright efficiency of the installation, there is installed on the oil supply tank a Sylphon Temperature Regulator.

Installed on the oil supply tank, Sylphon Temperature Regulators, by automatically regulating oil to a temperature of (nominally) 100° to 110° F., guard against the generation of gases in tank and make for easy pumping and big steam savings.

Installed on Secondary Heaters, by keeping oil at (nominally) 150° to 160° F.. they deliver it at the most efficient atomizing temperature.

Sylphon Temperature Regulators are entirely self-contained, and use as their expansion member the famous Sylphon Bellows. Made without soldered seam, its extreme sensitiveness and flexibility guarantees widest possible throw of valve and everlasting close and accurate regulation. Do not go another day without a copy of our complete Bulletin. Ask for ZTR 103.

Standardize with Sylphon for Safety

THE FULTON COMPANY

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New York Chicago Detroit Boston Philadelphia

Representatives in all principal cities in U. S.

European representatives:
Crosby Valve & Engineering Co., Ltd.,
41-42 Foley Street,
London, W. 1, England

Canadian representatives:
Darling Bros., Ltd.,
120 Prince Street,
Montreal, Canada

ers are subject to accurate control so that a slow fire can be started and the heat increased at will to prevent checking of the lining from too rapid drying.

Pressure Torch Heating Steel Car Frames for Straightening

Preheated castings with oil saves time, expensive welding gases, and the dirt and inconvenience incident to the use of charcoal or coke.

Steel members on steel underframe and all steel cars are seldom broken by usage but are frequently sprung or bent. Formerly the method of repair was to cut the rivets holding the bent members, heat in an open forge fire and straighten, after which the member would be riveted back in place. A torch will heat this same piece in place and it can be straightened without cutting a single rivet.

We know of an incident in which a steel car repair foreman said that he was able to complete a job in 40 minutes with two men and a torch that otherwise would have taken a crew two days.

To enumerate all of the uses and advantages of portable oil burning equipment here is impossible. The above examples of torch uses should be taken as being suggestive of the excellent qualities of speed and uniformity in heating small forges, furnaces, babbitt pots, and other portable equipment using the burner as a heating element where close control of temperature and atmosphere is essential and flexibility desirable.

Portable oil burning equipment is a comparatively recent development, probably within the past 25 years and that designed for fuel oils heavier than gasoline within a still more recent period, not over 20 years. It is only within the past few years, however, that there has been any real scientific investigation worthy of mention.

At first the blow torch or generating principle was the one that dominated. In this type the oil is forced from the tank by pressure of a hand pump, through a generating coil in the torch head, is heated and issues as a jet of gas into the nozzle forming the combustion chamber where all of the air supporting combustion is induced.

Generating Torches Thawing Ice and Snow from Railroad Switches

The high temperatures required to gasify the oil seems to break it down and leaves hard carbon depos-

(Continued on Page 55).

HEATING THE HOME

A Study of the Domestic Oil Burner

By C. H. Chalmers, E. E.

(Continued from the June Issue).

THE report of the test made on an oil burner by Professors Rowley and Shoop has been saved for the last part of this article. It must be understood, of course, that the University of Minnesota, where the test was made, and where these engineers are faculty members, and the American Institute of Mechanical Engineers, of which organization they are both members, are neither in any sense guaranteeing the accuracy of the test nor of the results.

However, the personal reputation of the men who performed the test is sufficient, for it was carried out to the best of their ability.

Test of Oil Burner

Rowley-Shoop Test

This test was made to determine the efficiency of the........domestic oil burner installed in a........... hot water boiler, No. 56 with a 25-inch diameter grate. Catalog rating 1240 sq. ft. of radiation.

In making the test the boiler was operated as a hot water heater, and cold water being supplied to the boiler at approximately 38 degrees F. and discharged at approximately 180 degrees F. The fuel used was a special low gravity (..........) distillate of 35.2 Beaume gravity. The high heating value as determined by the Bomb calorimeter was 19,580 B. T. U. per pound. The burner was adjusted to give a high percentage of carbon dioxide in the flue gas without the presence of smoke. Before taking data for the test proper the burner was adjusted to burn approximately twelve pounds of oil per hour and operated for a sufficient length of time to insure uniform operating conditions.

The following readings were taken at each five minute periods throughout the test, which was one hour in length: weight of oil, weight of water and temperatures inlet and outlet to boiler and temperature of flue gas. The flue gas analysis was taken at fifteen minute intervals throughout the test. An observation of the smoke stack during the test indicated a clear exhaust.

The following average results

were obtained for the one hour test:

AVERAGE RESULTS OF TEST

Date	January 31, 1924
Duration	1 hour
Room temperature F.	80.
Water to boiler, lbs.	1,145.5
Average temperature feed water F.	38.
Average temperature water from boiler F.	180.6
Temperature rise in boiler F.	142 6
B. t. u. given to water in boiler	163,348.
Oil to burner, lbs.	12.76
Gravity of oil Bé.	35.2
B. t. u. per lb. oil higher heating value	19,580.
B. t. u. per lb. lower heating value	18,178.
Viscosity Standard orifice at 122°	33.6 Sec.
Viscosity Standard at 77°	38.2 Sec.
Flash (open cup)	184.5 Fah.
Fire (open cup)	200. Fah.
Total B. t. u. to boiler higher heating value	249,841.
Total B. t. u. to boiler lower heating value	231,951.
Average stack gas temperature F.°	671.
Maximum CO-2 obtained %	13.4
Minimum CO-2 obtained %	12.
Average CO-2 %	12.78
Average O	2.12
B. t. u. lost in dry stack gas per lb. of fuel	2,318.
Percentage of heat lost in dry gas based on higher heating value	11.83
Percentage of heat lost in dry gas based on lower heating value	12.75
B. t. u. lost in stack gases due to burning hydrogen	1,910.
Per cent. heat lost due to burning hydrogen based on higher heating value	9.75
Total heat lost in stack gases B. t. u.	4,228.
Total per cent of heat lost up stack based on higher heating value	21 53
Efficiency of boiler % based on higher heating value of oil	65.4
Efficiency of boiler % based on lower heating value of oil	70.4
Radiation and unaccounted for based on higher heating value %	13.02
Radiation and unaccounted for based on lower heating value %	16.85

HEAT BALANCE—*Based on high heat value of oil*

Efficiency of boiler	65.4 %
Stack losses (dry gas)	11.83%
Stack losses (uncondensed water due to burning hydrogen)	9.75%
Radiation and unaccounted for	13.02%
Total	100. %

HEAT BALANCE—*Based on low heat value of oil*

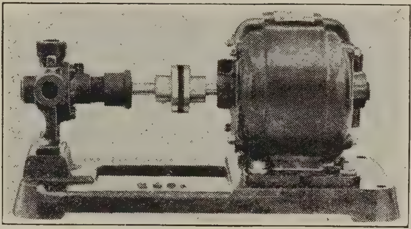
Efficiency of boiler	70.4 %
Stack losses	12.75%
Radiation and unaccounted for	16.85%
Total	100. %

Average Results of Test

This test with its data brings out some interesting points that are often overlooked by architects, engineers and purchasers and users of oil for fuel purposes. I refer to the high and low B. T. U. values of the oil. For the benefit of those not familiar with the chemistry of combustion let me say that when oil is burned it is converted into carbon dioxide gas and water vapor. The weight of water produced is about 34% greater than the entire weight of the oil. When 100 lbs. of oil are burned, 134 lbs. of water are produced. This water passes out the stack as vapor, and it is the B. T. U. of this water vapor which would be recovered were the vapor cooled to the room temperature, that makes

(Continued on page 51.)

Dependability



This highly improved direct-drive pump is an outstanding advance over any previously known to the oil burner industry—in performance; in durability and general dependability. This pump is designed and built to meet the particular requirements of oil burners and faithfully measures up to necessary standards.

A Size for Every Requirement

Number	Port Size	Capacity at 1750 R. P. M.	Motor Size
0001	¼"	1 G. P. M.	⅛ H. P.
0002	½"	2½ G. P. M.	⅛ H. P.
0003	½"	5 G. P. M.	1/6 H. P.

THE ADAMS ROTARY PUMP CO.,

2032 E. 22nd St. CLEVELAND, OHIO

The Oil Burner Patents Controversy

By Keith J. Fanshier

IT is doubtful if there is a single question before the oil burning field today of more interest than the burner patent situation. In common with every other angle of the burner business, the patent problem represents merely a somewhat nebulous state of mind on the part of the leaders in the industry. The oil burning era is so clearly in its infancy that the answer to many problems is a difficult matter. The patent question is one of the most puzzling of these.

Webster defines the term "patent" as "a government protection to an inventor, securing to him for a specific time the exclusive right of making and using an invention." The ramifications of patent rights and practices, especially when an industry is in its early stages of development, refuse to confine themselves to so simple an explanation. The subject of patents as affecting oil burners is no more complex than in any other business. The oil burner industry is open to many types of development. The fact that its members realize its tremendous possibilities and its liability to changes has a tendency, however, to complicate further an already difficult subject. One authority says a patent amounts largely to the right to a lawsuit. It is true the elementals of a patent consideration almost automatically mean resort to law to test the patent on the one hand and to protect it on the other.

It is apparent that no very great oil burner patent conflict is imminent when an official of one of the largest companies in the field asks: "It is a natural desire and instinct, in seeing anyone grab your property and appropriating to himself things that belong to you, to throttle him. . . . but is it the thing to do?"; and an official of an equally large company answers, indirectly: "We believe it is better for the industry that there be a certain degree of freedom which cannot be had under restricted patent practices."

There are two substantially different viewpoints in the industry with reference to handling the patent question. Broadly speaking, one faction contends the patents covering any device ought to be protected by a hard-boiled policy,

If Oil Were Gold,

Bowser tanks would be the tanks invariably selected to hold it.

But, because oil is so relatively inexpensive, some men think cheap tanks are "good enough".

But, even if oil were only 50 cents a gallon, a Bowser tank would be cheapest in the long run. A 1000 gallon tank holds $500 of very real money, if oil is 50 cents a gallon. If you use 1000 gallons a month, you will have put $6000 of your cash through that tank in one year. Even a 1% leakage would cost you $60 a year—which is considerably more than the difference in cost between a genuine Bowser tank (guaranteed leakproof) and the just-ordinary maybe-it-will-leak tank.

Think it over—then get Bulletin 9.

BOWSER
ESTABLISHED 1885

S. F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters
FORT WAYNE, INDIANA.
Sales and Service Offices and Representatives Everywhere

and an iron-clad execution and administration of the patent; that competition drawing close to the boundary line of the company's rights should be shown no mercy—in other words that a company protected by strong patents should maintain a policy of strict enforcement of patent rights. The opposing idea, the more sensible view for the industry and the public alike, is a practice whereby cooperation will have its place, with a certain amount of lee-way for competition under given patent rights, and the strength of one concern upholding a general principle multiplied by granting to other concerns the right to use these specifications, ideas or processes. Thus we have this situation: "splendid isolation" as against cooperation, tolerance and multiple strength. Both have their following.

The burden of administering all the necessities of a large and growing business within the limits set by a patent right upon which the business is built is plainly heavy; especially when not only that business but the whole industry is a new one. Educating the public, creating goodwill, emphasizing the advantages of exclusive features, building up a marketing organization, and the necessity of differentiating properly from others in the field are real problems, calling for capital, time, energy and thought in liberal quantity. There are certain attractive features about "letting down the bars." This is now un-

Teesdale Pumps for Oil Burners

Dealers and Distributors

Write for special trial offer on our Type B Pump, with motor on base. This unit is designed for dealers, and is specially adapted to gravity feed burners. It will supply either gravity or pressure burner directly from outside tank or supply a small inside tank with float switch.

Teesdale Oil Pumps Have
- Noiseless operation
- Very high suction lift
- Simple yet durable construction
- Direct operation at motor speed
- Capacity, 30 gallons an hour and up.
- Only three moving parts, oscillating type.

For Manufacturers

We build to order to meet your special requirements.

TEESDALE MANUFACTURING COMPANY

320 Douglas Street **Grand Rapids, Michigan**

Who Buys Oil Burners?
The Housewife

—she's the one who must be satisfied—she's the one whose continued satisfaction makes or mars the sale.

Frequent attention and complicated operation which requires a more or less technical knowledge sets up a sales resistance difficult to overcome.

The Jefferson electric ignition and control simplifies oil burner operation to the point where it requires practically no attention. The Jefferson coil delivers an intensely hot spark that will give positive ignition to gas pilot or fuel direct. The transformers furnish the power for the operation of thermostatic and relay mechanism; this system of control insures a constant even temperature.

Jefferson electric ignition and control has been adopted as standard equipment by many of the leading manufacturers of Oil Burners.

It can be adapted to your system as well.

Our engineers will make a study of your requirements and design equipment accordingly.

Write today for further information.

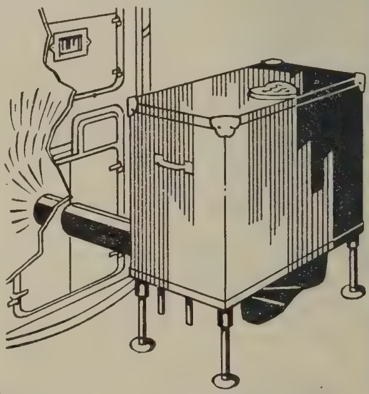
JEFFERSON ELECTRIC MFG. CO.
434 So. Green St., Chicago, Ill.

der consideration by certain oil burner manufacturers who heretofore have held aloof from anything of this nature.

In the industrial and commercial history of our nation, we find the struggle between two opposing ideas; restricted manufacture and distribution under protection of more or less exclusive rights; and the opening of valuable processes or methods to use by competition under certain limitations of license. There are plenty of examples of these diametrically opposed ideas. The oil refining industry, the automobile manufacturing industry, virtually all the important industries can furnish illustrations of the working out of both ideas. It has not been a great while since the Standard Oil Company of Indiana decided to throw open its Burton process for "cracking" gasoline to any company agreeing to make a certain royalty reimbursement. A good illustration of the other method is the Pierce Arrow company's handling of the fender headlights on its motor car. This is controlled so that only Pierce Arrow cars so carry the lights on the fender.

The Franklin motor car exclusively controls rights to the air-cooled car so that no other maker uses the principle. Some experts now believe the best course for the benefit of all concerned would be the licensing of these methods of design.

In order to get the patent situation in the burner industry on a more comprehensive and simpler



Safety-- Comfort
Low Cost

Explains why the Hart Oil Burner is rapidly taking the field.

The Hart Oil Burner competes with no other oil burner — in character individuality and principle, it strikes a refreshing new note—the skill of its operating bespeaks the master builder.

Burns low grade fuel oil.

Hart Oil Burner Co.

Department 101 **Peoria, Ill.**

"HART HEAT"

Safe Underground Storage

of Structural Quality Steel---Electrically Lap Welded

Graver Welded Underground Tanks are made of the highest grade structural quality steel This alone gives them a decidedly greater strength and adds years to their life.

They are electrically lap welded. This means that after the plates are carefully fitted, the metal is so perfectly fused that joints equal to a continuous plate are obtained.

These are reasons why your oil, when stored in a Graver Welded Underground Tank, is safely stored. And as double insurance every tank is hydrostatically tested and thoroughly inspected.

We have ready for prompt shipment standardized sizes for every storage need. And remember—the large-scale production of GRAVER gives you quantity prices on single tanks.

GRAVER *Corporation*

(WM. GRAVER TANK WORKS FOUNDED 1857)

Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment

160 Todd Avenue, East Chicago, Ind.
New York Chicago Tulsa Houston

basis, a group of large burner manufacturers recently retained patent attorneys to make an exhaustive study and investigation of the whole range of oil burner patents in the government records at Washington. This investigation, which is entailing a vast amount of time and much money, is still in progress. It is expected, when it is completed, that the whole question will be correlated and simplified so that cooperation will be more easily attained. The burner manufacturers behind this movement report that they are not yet ready to announce their exact policies after they have obtained this complete patent information. However, it is apparent most of them believe a change in handling patent rights might be preferable. A change would mean a more tolerant policy, for heretofore a number of concerns have instituted legal proceedings to protect their patent rights and otherwise have adopted a "hands off" policy.

Want To Stifle Competition?

A. B. Frenier, vice president of the American Nokol Company, manufacturers of Nokol burners, recently touched on the patent situation in an address before a convention of Nokol dealers in Chicago. "How much protection do you want?" asked Mr. Frenier. "Do you want to stifle competition completely? What have you gained if you do it? I know it is a natural desire and instinct in seeing anyone grab your property, appropriating to himself things

The Ford of the Oil Burner Industry is Here!

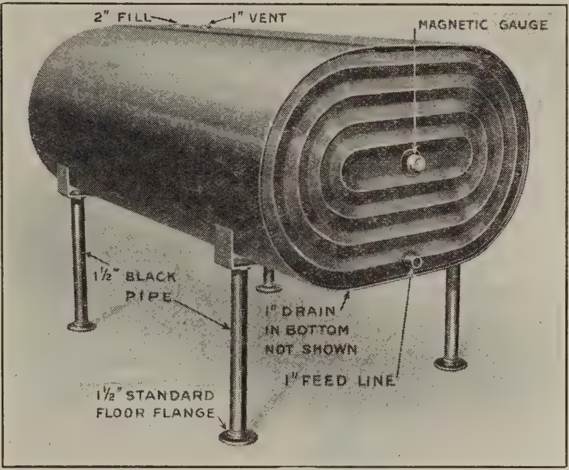
An Air Blower Type Oil Burner Equal to the Best on the Market

Oil pilot light—No gas required.
Simple construction and easy to install.
Retails for less than $300 with automatic controls and tank.

Efficient production makes this offer possible.
Wire or write for descriptive literature for your territory.

Oil Heating and Refrigerating Co.
819 Chicago Avenue
EVANSTON, ILLINOIS

GENWELD OBROUND INSIDE FUEL OIL STORAGE TANK



FOR DOMESTIC OIL BURNER USE
MAXIMUM CAPACITY 250 GALLONS
LENGTH 60", WIDTH 42", DEPTH 26"

Also Manufacturers of Underground Storage Tanks for Gasoline and Oils

Send for complete description and price

GENERAL WELDING PRODUCTS, Inc.
5027 McKissock Ave. ST. LOUIS, MO.

which belong to you, to throttle him. 'It is mine' is the instinct which perhaps is more highly developed in the manufacture of patented devices than anything else which I know of, but is it the thing to do?

"A Wonderful New Industry"

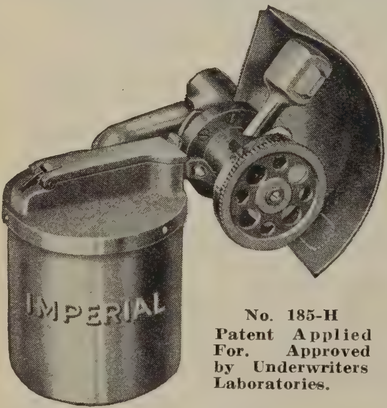
"You know there is much to be said for and against the proposition. We are right on the threshold of a wonderful new industry, a thing unknown six years ago, a new thing, that is revolutionizing home life. Some of the best minds in the manufacturing business in the business world today declare without hesitation that this automatic system of heating the home by the use of liquid fuel is going to be one of the big industries of this country.

"We have had a difficult task, to get the public educated to a point where they are today. It has not been play, by a long shot. Is it well to continue the fight single-handed? Every good business man in this room will admit to me right off the bat that good competition is a good thing. The right competition is a good thing in any line of endeavor, especially in a new industry.

Evil In Patent Throttling

"You can look back in the history of some of our better mechanical devices that are being used today and you can see the evils of the determination to throttle through patents, when it would have been far better for those institutions had they licensed or made it possible for the other fellow to

IMPERIAL OIL CONTROL AND SAFETY TRIP VALVE



No. 185-H
Patent Applied For. Approved by Underwriters Laboratories.

Positive in operation, easy to install and meets all service demands better than any other valve.

Other Imperial Oil Burner Specialties are:

Safety Trip Valves
Indicator Valves
Oil Strainers
Shut-off Cocks
Needle Valve Drain Cocks
Copper Tubing
Oxygen Carbon Burning Outfits
Brass Pipe Fittings
Tubing Couplings
Angle and Globe Needle Valves

Write for catalog giving complete information about prices, sizes and installations.

IMPERIAL BRASS MFG. CO. 1224 W. Harrison St., Chicago

Something Entirely New In Oil Burning

For Home Heating

There has been perfected for home heating an oil burner that handles low grade fuel oil efficiently—without roar.

The combustion principle is a distinct departure from previous practice. It eliminates noise, reduces by half the temperature of escaping chimney gases and cuts fuel costs to a new low level.

The new burner, the Sword Automatic, appeals to dealers and home owners alike, for it brings the cost of burning oil far below the cost of burning coal. Installation cost is low, satisfaction is immediate and continuous.

The Sword Automatic Oil Burner assures the dealer his full profit and the home owner complete satisfaction at lower cost than ever before.

Write for particulars about the revolutionary features it embodies and its strong appeal to dealers.

Information sent promptly on request

SWORD & KIMBER COMPANY
4861 Stenton Ave.
PHILADELPHIA, PENNSYLVANIA

help along this work, educating the public to the use of these devices."

E. W. Sladkey, sales manager for the Winslow Boiler and Engineering Company, manufacturers of Kleen-Heet Automatic Oil Burners, said his company for the present was following a policy of "live and let live" as far as patent rights are concerned.

Want Freedom In Development

"We believe it is better for the industry that there be a certain degree of freedom in the development of the industry which could not be under highly restricted patent practices," said Mr. Sladkey. He pointed out, however, that the ultimate, fixed policy of his company and several other companies had not been determined.

"Occasionally we hear salesmen boasting to prospective customers that an alleged infringer will be dealt with harshly by the salesmen's respective companies. If we hear this from our salesmen we are quick to put an end to such practices. We are, of course, proud of our own patents and we believe them to be the best, but at this time it is not for a representative of our company to say that we will prosecute infringement cases by the wholesale. We wish to await developments."

It is true that several suits have been instituted by one or two burner manufacturers in cases of alleged infringements. Because of the present trend away from isolated patent enforcement, however, these suits are at a standstill.

An Hourly Inventory on Your Oil Supply

Pneumercator Tank Gauge

Every gallon that comes in—every gallon you use—the amount on hand—all are shown instantly and accurately, at your desk if you will, by this simple, safe, non-electrical indicating device. It's a watchdog on your oil supply—preventing waste and saving time and trouble. The Underwriters have approved it—leading oil burner manufacturers endorse it.

Write for the descriptive Circular

PNEUMERCATOR CO., Inc.
40 Flatbush Avenue Extension.
Sperry Building
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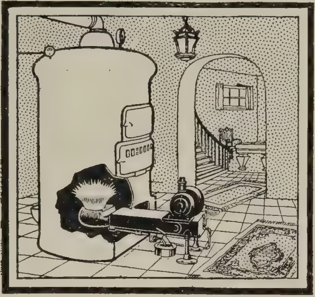


ELECTRIC IGNITION

Now a Proved Success

The perfection of electric ignition for oil-burners is a victory of Kleen Heet engineers.

Hundreds of Kleen Heet electric-ignition burners have been installed in all parts of the country. The results have been very gratifying.

With electric-ignition Kleen Heet burns the lowest-grade of oils that is practical for domestic fuel. And gives greater heat units per dollar spent for fuel.

This method of ignition has been perfected by our engineers to afford absolute safety and dependability.

Electric ignition is past the experimental stage. Today it is a demonstrated success.

There are still a few exceptional territories available for the right type of dealer. For our attractive proposition write or wire—today.

Kleen-Heet

NO LABOR · NO COAL · NO ASHES

Automatic Oil Burning Systems

Division of

WINSLOW BOILER AND ENGINEERING CO.

General Offices: **208 South LaSalle St.**

CHICAGO

Oil heat for the smallest bungalow to the tallest skyscraper

FUEL OIL MARKETS

Big Demand for Heavy Oil Appears —Light Oils Steady

PRICES in fuel oil markets are showing a trifle more firmly under pressure of the early summer season than generally was expected, in spite of a general fractional downward revision. In the main the demand has been sufficient to warrant a fairly strong undertone, and it appears now that the present fuel and burning oil prices may be maintained for the next month and possibly for the entire summer.

Buy For Immediate Use Only

Buying only for immediate requirements has been a feature of the fuel oil business for several months and is likely to continue during the summer. Numerous purchasers continue to hold to the belief that fuel oil will be cheaper before the end of summer. Nevertheless, large users of fuel oil have been buying in quantity recently, among them several Southwestern railroads, and this has had a stiffening effect upon the market.

Prospects are for a heavy demand for heavy fuel oil and distillates for fall. Jobbers have only comparatively small stocks of both grades of oil, and in most cases refiners are refusing to consider prices of less than seventy-five cents and are holding for what they consider will be a much stiffer market beginning about August 1.

The fuel oil output of numerous Mid-Continent refiners has been contracted for the coming season and this is a contributing factor to the firm attitude of those refiners who are open for sales. Stocks of gasoline are still high, in spite of record-breaking consumption figures, and a good many refineries are shut down to only a fraction of their capacity. This means fuel oil stocks are not being accumulated as fast as might otherwise be the case, and that prices probably will not slump a great deal.

Sight Losses In Kerosene

The kerosene situation appears steady after slight losses, selling between four and four and one-half cents. Domestic burner distillates rule around three and one-half cents. In this the market is dull and may be expected to be so for six weeks or more.

During the past month the prices of Smackover and East Field

For *More*
Cheaper
Controlled
Healthier
Cleaner **Heat**

Install the Tried and Proved

Universal Automatic Oil Burner

It has demonstrated its superiority in every type of furnace and in every kind of home.

It functions equally well in hot air, steam, vapor or hot water heating plants.

Heat of any predetermined degree can be maintained automatically in the smallest bungalow or the largest apartment or factory.

Burns fuel oil, the cheapest of fuels! Requires little attention! Quickly pays for its reasonable cost in the savings it effects.

Exclusive Territory Open For
Live and Responsible Dealers!

Write for particulars

Universal Automatic Oil Burner Corp.
238 W. Larned St., Detroit, Mich.

"Universal Automatic Heat Makes the Home Complete"

crude fuel oils have been cut to 75 and 77½ cents respectively and have held at that figure quite steadily.

Current Tank Car Prices

The following prices are for car lots in sellers' tanks f. o. b. Group 3 or freight adjusted to that delivery.

Fuel oil, 24-26 gravity, low sulphur, bbls.	$.75	to .80
Fuel oil, 26-28 gravity, low sulphurs, bbls.	.80	to .85
Fuel oil, Smackover, bbls.	.75	
Gas oil, 32-36 gravity, gals.	.02⅝	to .02¾
Distillate, 36-38 gravity, gals.	.02⅞	to .03⅛
Distillate, 38-40 gravity, gals.	.03⅛	to .03⅜
Distillate, 40-42 gravity, gals.	.03½	to .03¾
Kerosene 41-43 gravity, gals.	.04⅛	to .04⅜
Kerosene 42-44 gravity, gals.	.04¼	to .04½

Diesels In Liners

Two new passenger liners that the U. S. Shipping Board proposes to build, will probably be equipped with Diesel engines, according to an announcement made by Vice-Chairman Plummer recently. The ships will each have a tonnage of 32,000 and a speed of 20 knots an hour. It is estimated that 25,000 horse power will be required to drive ships of this size.

M-D-Co. Hand Pump for Handling Oils

We wish to emphasize that the M-D-Co. Hand Rotary Pumps are especially applicable to oil burners when users are satisfied to pump oil with a hand operated pump. Our No. 553 Hand Pump we guarantee will not leak; will positively deliver oil without pulsation in the flow. Requires no priming, having positive suction lift from 5 to 6 feet; capacity 10 to 15 gallons per minute. Pumps so easily a child can operate. In fact, a pump we absolutely guarantee will do the work and will last a life time with little or no attention. Requires no adjustments or replacements of working parts. Its novel and unique principle reduces friction to a minimum and the beauty of it is our pump works both ways. You can pump out of the tank or back into it if the occasion arises.

M-D-Co. Rotary Pumps, hand operated, in larger sizes as well as Direct Drive Motor Power Pumps furnished in capacities to meet practically any conditions.

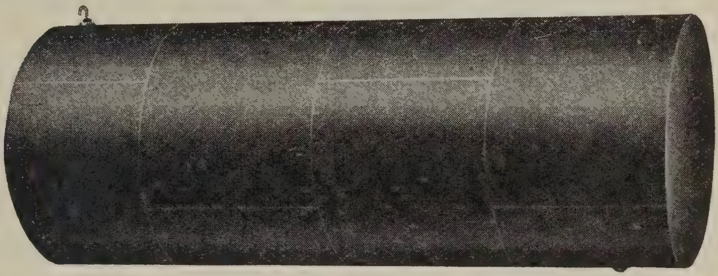
Write us today.

Mechanical Devices Co.
134 Fox Street
AURORA, ILLINOIS

Trustworthy

Users can trust Butler tanks. They know that the valuable contents of the tank (which is often worth many times more than the tank itself) will be kept safely in a Butler tank.

Dealers can trust Butler tanks with their business and future orders because their customers get the service that they want.



Butler Fuel Oil Tanks

Offer this service in above or underground types. Many large firms throughout the country use Butler tanks exclusively because they can trust them. Regardless of size or type, trustworthiness prevails.

With two large factories to serve you, viz.: Kansas City and Minneapolis, where large stocks of various sizes are carried for immediate shipment, we are in position to give you excellent service. With complete stocks on hand orders that we receive need not be rushed through. For we endeavor to fill every order from stock on hand—to ship tanks that have been made in modern up-to-date fully equipped factories by competent workmen.

A circular illustrating Butler tanks and giving valuable information to every tank user will be sent on request. Shipments will be made from nearest factory.

Butler Manufacturing Company

Kansas City, Mo. Minneapolis, Minn.

Fuel Oil Demand Down In April

Total domestic demand for gas and fuel oils in the United States during April was 992,562,105 gallons as compared with 1,071,002,713 gallons in March and 949,100,951 gallons in February. Total domestic demand in April, 1923, was 903,762,842 gallons, 9.8 per cent lower than April this year. The decrease in consumption from March, 1924, to April, 1924, was about 7.9 per cent.

The country's total production of gas and fuel oils during April was 1,116,763,663 gallons, an increase of 2,351,938 gallons over March. The stocks on hand on May 1 amounted to 1,555,138,934 gallons, compared with 1,509,455,339 gallons on April 1 and 1,550,502,825 gallons on March 1. Stocks on hand May 1, 1924, were 1,272,978,330 gallons, which was enough to supply the country for about 43 days should production be entirely stopped.

Bird Has "Better Heat" Pamphlet

A new circular has been issued by the Bird Burner Company, Minneapolis, Minn., describing the Bird Oil Burner, under the subject, "Better Heat with Less Effort." Three sizes of the Bird burner are illustrated and described, with a list of the approximate hot water capacity in square feet of radiation, steam capacity in square feet of radiation, the approximate room heating capacity of each and the capacity compared with coal consumption in tons.

Oil Burner Castings

IRON AND BRASS **UNFINISHED OR MACHINED**

Various parts of oil burners require different qualities of iron for their particular use. Some require close grained leak proof or heat resisting qualities; some require soft iron for a large amount of machine work; some can be rough castings where finish is of no particular importance.

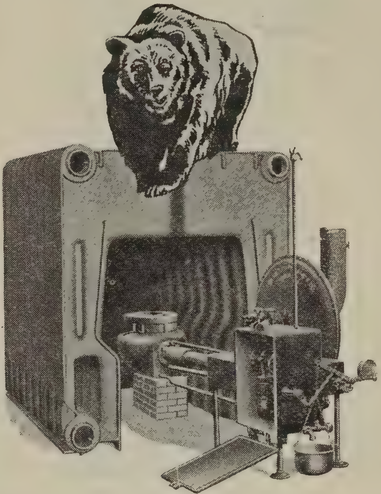
Our five foundries and machine shop insure you of our ability to take care of your requirements in every respect.

Chicago Hardware Foundry Co.

North Chicago, Illinois

Announcement!

It's a Bear Oil Burner



After three years of preparation and experiment we wish to announce a new oil burner for store, factory and domestic heating purposes.

It combines rigid durability, automatic regulation and exceptional efficiency, and has the following unique features of design:

1. Gravity Feed
2. Practically Noiseless Fan
3. Automatic Temperature Control
4. Scientific Carburetion
5. Automatic Against All Uncontrollable Conditions (power pipe stoppage and etc.)

Write or wire for further details.

Bear Combustion Co.
York, Pennsylvania

New-Type Oil Burner Proved for Five Years

Five years ago the first OIL-O-MATIC Oil Burner was made. Thousands are now in use and every user is satisfied. Burns cheapest fuel oil. No continuous pilot light. No part inside furnace or boiler. No gears. Moving parts run in oil. Tested and listed as standard by Underwriters' Laboratories. One of the fastest selling oil burners on the market. New deferred payment plan doubling sales for present dealers.

A few territories still open to men who can qualify. Write today for full information.

C. U. WILLIAMS & SON

Main Office and Plant
BLOOMINGTON, ILL.

Branches in all leading cities.

WILLIAMS
OIL-O-MATIC
HEATING

Minneapolis Acquires New York Firm

The Minneapolis Heat Regulator Company has taken over the entire business of C. O. Baring, Inc., its New York distributors. The newly acquired plant will be conducted as a factory branch, continuing in its present location in the Grand Central Terminal Building and 34 Park Place, Newark, New Jersey. W. H. Wilson, vice-president of the company, will continue in charge.

C. B. Sweatt has been placed in charge of the sales department of the Minneapolis Heat Regulator Company, with C. D. Lyford as assistant. He also maintains charge of the publicity department, with R. C. Martin as assistant. B. L. Boalt, of the home office, who was made a director of the company, has been elected secretary.

Issue Pyrometer Catalog

Instructions for the installation and care of thermo-electric pyrometers and a catalog of pyrometers and attendant equipment are included in a 72-page booklet recently issued by the Brown Instrument Company, Philadelphia. It contains detailed directions for protecting tubes, making wirings, checking instruments for accuracy, locating defects in the electrical circuit and many other important points in installation of this kind. The book also contains temperature millivolt equivalents for thermocouples and conversion of Fahrenheit and Centigrade scales.

THE BASEL TYPE E-3 HEAT REGULATOR

is now equipped complete, with Thermostat, magnetic control, mercoid switch for operating motor, valve, automatic cut-off, of both oil and motor from overflow of oil to trip bucket, Thermostat control and automatic cut-off each being independent of the other.

Hand control independent of either the Thermostatic control or automatic cut-off.

Removable strainer, air seal, enclosed in steel case.

In fact everything in a nut shell. What more do you want? For Mechanical or Gravity Feed burners.

Basel line of valves and heat regulators are made in seven types. Two of which are approved and listed as standard by the Underwriters Laboratories of the National Board of Fire Underwriters. All frictionless and packingless.

The Basel line of valves and heat regulators are not just ordinary valves. They mean advanced theories in Heat Regulators and Valves and Valve control construction.

Valves and valve control is our hobby. Literature on request.

911 Mulberry St. **BASEL MANUFACTURING COMPANY** Kansas City, Mo.

NIAGARA OIL METERS

Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.

2926 Main St.

Buffalo, New York

Standard Oil Co. Makes Burner

Several new mechanical principles are embodied in the Socony Arrow Oil Burner that is being manufactured and marketed in New York by the Socony Oil Burner Corporation, a subsidiary of the Standard Oil Company of New York. Chief among the new principles is the elimination of the drip pan for the safety cut-off valve, the valve being operated by means of back pressures from the draft which closes a butterfly valve in the oil line whenever the fire goes out.

The burner is beautifully finished mechanically and is listed as Standard by the Underwriters' Laboratories. It is installed with a 1,000-gallon oil storage tank and a sixty-gallon auxillary supply tank which is filled from the storage tank with a hand pump. A catalog has been issued by the manufacturers.

Diploma Given By Oil Burning School

Diplomas were received by 334 students on May 1 when the first year of the Todd Oil Burning School, New York City, was completed. The day sessions were completely successful during the entire year and a number of night sessions were also held. Instruction was given in practical oil burning, theory of combustion, boiler efficiency and absorption efficiency.

Why OHIO?

When you remember that many motors have more parts in the starting switch alone than the Ohio has altogether, you can easily understand why the Ohio so seldom gives trouble.

Simplicity and Ruggedness form the basis of Ohio design because Ohio Engineers with many years of experience in the small motor field know the conditions of abuse and neglect under which the average small motor must operate.

Send for Bulletin No. 204.

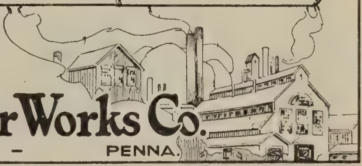
The Ohio Electric and Controller Company
5920 Maurice Avenue, CLEVELAND, OHIO

A Standard Size for Every Oil Burner
Known Everywhere for Their Quality

Established 1860
Incorporated 1907

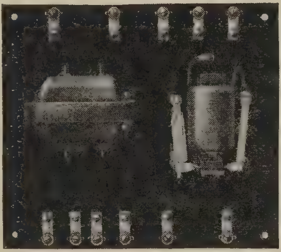
SHARPSVILLE TANKS
65 TO 30,000 GALLONS
HORIZONTAL & VERTICAL

EASTERN SALES REPRESENTATIVES
FOR McDONALD OIL EQUIPMENT



Sharpsville Boiler Works Co.
SHARPSVILLE - - - PENNA.

Thermostat Troubles Eliminated



"Signal" Thermostatic Control Relays eliminate the "weak-link" in oil burner control by absolutely preventing arcing or burning at the thermostat contacts.

All panels have approved wiring, and clearly marked terminals, are rigidly tested and ready for external connections. They are supplied with or without housing, complete with wiring diagram.

Let us know your control problems. We will gladly submit a panel to meet your needs so that you can convince yourself of its dependability, efficiency and low cost.

Provision can be made for pressure-stat, pilot light or other control that may be used to supplement thermostat.

Write for Bulletin A-40

SIGNAL
ENGINEERING & MFG. CO.
533 CANAL ST., NEW YORK, N. Y.

U.S. GAUGE CO. N.Y. GAUGES U.S. GAUGE CO. N.Y.

PRESSURE—VACUUM

All sizes and types for every purpose.

Service our Solicitor

U. S. GAUGE CO.

308 W. Randolph St.
Chicago

44
Beaver St.,
New York

BRN
QUALITY PRODUCTS

Why Dealers Select the

B-R-N-Domestic Oil Burner

Burns any grade of oil.
New Method Electric Ignition (no gas.)
Foolproof, quiet, sootless, odorless.
Shipped and tested, entirely assembled.
Minimum installation and service costs.
Entirely automatic, thermostat control.
Operates satisfactorily in any heating plant.
Sold under five year guarantee.
Attractive proposition to dealers.

Write

BLAKE-RAYMAKER-NAUMAN

1223 So. Michigan Ave.,
Chicago, Ill.

Unique Advertising Brings Results

From three to six potential sales inquiries every day are produced by a novel publicity stunt that has been adopted by the Willis W. Howe Company, Kansas City, manufacturers of the Royal oil burner. Each day a Royal burner, mounted on a small flat wagon, is wheeled out and set in operation on the curb in front of the Howe establishment on McGee Trafficway, along which a great deal of the traffic to and from south and southwestern Kansas City passes. That it attracts the attention of the passing public is proved by the number of inquiries received.

A. A. O. B. M. Directors To Meet July 8

The quarterly meeting of the Board of Directors of the American Association of Oil Burner Manufacturers will be held in the Congress Hotel, Chicago, July 8th, at 10 a. m., according to a recent announcement by Leod D. Becker, secretary. A number of important matters will be discussed at the meeting, among them being the selection of a convention city and dates for the annual convention of the Association in 1925.

Chairman Butler of the House Naval Committee recently introduced a bill which will authorize the Navy to convert four coal burning battleships to oil burners.

New Tank Makes Bow

Explanation of the name "Obround" which their fuel oil storage tank bears can be found in the fact that the tank is partly oblong and partly round, according to the General Welding Products Company, St. Louis, manufacturers. The tank is built to rest on a light frame, the supports of which rest on the floor of the basement. One of the reasons for adopting the "obround" shape was to assure ease in passing the tank through areaways, basement windows and passages, company officials say. It is lap welded and has a magnetic gauge.

Empire Refineries Issues Booklet

Further evidence of a strong campaign to gain fuel oil business was shown recently by the Empire Refineries, Inc., Tulsa, when that organization distributed copies of a small booklet entitled "The Truth About Fuel Oils for House Heating". It contains a review of oil burner development, enumerating the causes of changes, and gives estimates and figures on the number of homes, hotels and office buildings being heated with liquid fuel. Descriptions of the different grades of fuel and gas oils and the uses for which each is best adapted are also given.

There is still in use at Derby, England, by the London, Midland and Scottish Railways, a small locomotive that is 60 years old and has always been fired with oil.

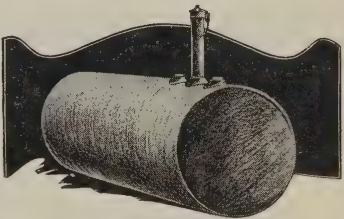
Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers". It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York

Branch Offices in the Larger Cities



STORAGE TANKS

For Furnace Oil

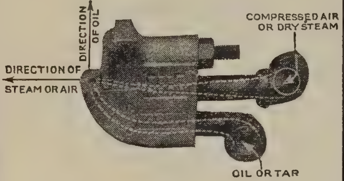
- **—Best open hearth steel**
- **—Welded seams and flanges**
- **—Tested oil tight**
- **—65 to 2000 gal. capacity**

Write for Prices

GILBERT & BARKER MFG. CO.
Springfield, Mass.

W. N. BEST

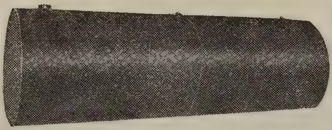
Oil Burners



The BEST since 1890

W. N. BEST Corporation

11 Broadway New York City



TANKS

For Fuel Oil

Capacities 260 to 10,000 gallons

Popular sizes carried in stock

The Boardman Co.
Oklahoma City

Write for Catalog and Prices

Nokol vs. Cutler-Bell Suit At Standstill

The suit instituted in Minneapolis by the American Nokol Company against the Cutler-Bell Company, formerly Minneapolis dealers for Nokol, but now handling Kleen-Heet, is apparently at a standstill. Three charges were brought against the defendant by the Nokol Company when the suits were filed. It was alleged that the Cutler-Bell Company, after discontinuing handling the Nokol burner and taking over the Minneapolis agency for the Kleen-Heet, retained the old telephone number, carried the words "No-Coal" in the Kleen-Heet trade mark on the advertising, and used the words "operating under Doble patents" in their advertising.

The case has not been docketed so it will require at least a year's time to get action. It seems unlikely that anything further will be done in the suit unless the Ordway-Cutler Company, successors to Cutler-Bell, take steps to bring it to trial.

Pump Has Float Control

Control by an automatic float, or pressure switch, is a feature of the No. 453 Power Driven Rotary Pump for oil burners manufactured by the Mechanical Devices Company, Aurora, Ill., according to bulletin recently issued by that company. The pump is operated by a 1-8 horsepower motor and is capable of 240 gallons per hour against no pressure.

A STUDY OF THE DOMESTIC OIL BURNER

(Continued from Page 24).

the difference between the high and low heat values.

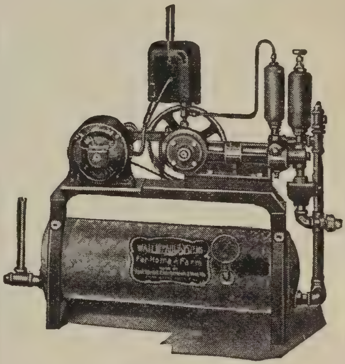
Considering that commercial stack temperatures are always above 212 Fahr. it seems to the writer an absurdity to do otherwise than use the low heat values of oil in the discussion of boiler efficiencies and oil burner design. In the Rowley-Shoop test the boiler efficiency is 65.4% figuring the high values and 70.4 figuring the low. The latter is the one that alone merits consideration.

Oil 60 Per Cent Efficient

The U: S: Bureau of Standards (Letter Circular L. C. 100) compares oil and coal for domestic heating on a basis of 40% efficiency for coal and 60% efficiency for oil. This test shows that the Bureau's estimates are well founded and demonstrates to a certainty that anthracite coal cannot hold the field against oil unless coal is lowered in price or oil goes higher. This also takes no account of the reduced labor and increased cleanliness of the domestic burner over the coal burning plant.

It shows that only 12.75% of the entire thermal energy of the oil is escaping from the boiler in other than as useful heat, because the average home requires all the heat radiated from the boiler to give needed warmth to the basement and basement ceiling. Some considerable portion of the stack losses are of course recovered from the chimney where it passes up through the

"PAUL" OIL PUMPING SYSTEM
For Oil Burner Service
SOLVES THE PROBLEM



The "PAUL" Oil Pumping System will pump oil from any source of supply (large storage tank) where the maximum lift will not exceed 22-feet. It gives a constant supply of oil through reducing valve to burner. It supplies oil at the right temperature. It is quiet in operation. It is efficient and economical.

The "PAUL" Oil Pumping System consisting of a self-priming, self-lubricating pump, belted to a special heavy duty pump motor; a small galvanized supply tank, automatic controller, pressure gauge, relief valve and discharge line between pump and tank. Completely assembled. Shipped ready to install.

Full information and prices sent upon request—Bulletin No. 5027.

Manufactured by

FORT WAYNE ENGINEERING & MANUFACTURING COMPANY

Main Office and Factory
Fort Wayne, Indiana
Branch Offices in all Principal Cities.

first and second story of the home.

There is much confusion of ideas relative to stack temperature in domestic oil burning installations that the Rowley-Shoop test makes perfectly clear. The outstanding item is that usually the home owner can use his coal fired boiler to excellent advantage with oil, as the boiler used in this test is of a very usual type. A domestic burner in Minnesota generally runs an average of about six hours per day. It is shut down for eighteen hours so that the average stack temperatures met in practice for oil and coal compare very favorably.

The futility of attempting stack temperatures below the point of condensation seems apparent as it would result in a wet stack.

The better class of domestic burners are therefore in the class with the Stradivarius violins so far as efficiency goes.

The need of the industry is reliability and simplicity of design, good engineering practice in installation, and the use of the best auxilliary apparatus the market affords.

Burner Should Be Complete

Every domestic oil burner installation should be built in complete accordance with the most up to date engineering practice in regard to the electric wiring, the gas and oil piping and the burner design itself.

We are on the threshold of freeing a good percentage of American homes from the drudgery of coal, dirt, and ashes. We shall promote health and happiness by neither under heating nor overheating. We shall to some extent lengthen the

GOULDS

Hand Rotary Pump for Fuel Oil Systems

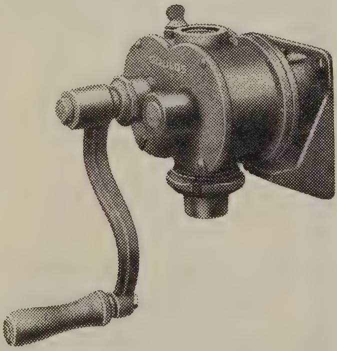


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings for handling distillate.

Furnished with bracket for attaching pump to side wall. This is a big improvement over the type that depends on pipes for support.

Capacity—10 gallons per minute.

Note: We also have a motor driven pump for the same service. Capacity, 3 G. P. M.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. **Seneca Falls N. Y.**

span of human life itself. We shall in a decade rear and train the needed number of skilled workmen to care for the public need and welfare in heating their homes with oil. And finally the oil supply will not fail, for when the ground oil is gone our oil shales offer a safe and sure anchor to the windward for thousands of years to come.

The use of Diesel-powered shovels in the construction of highways is meeting with great success in the state of Washington, through which the Olympic Highway is being built. One of these shovels, used by a contractor, handles 600 yards of rocky soil on a consumption of 14 gallons of nine-cent fuel, a great saving over the ordinary shovel operated by steam.

Permanence

The oil burner industry like all new businesses, attracts the venturesome and speculative as well as the reliable and permanent type of manufacturers.

Chalmers Oil Burners are built for permanent satisfactory service. To become affiliated with this organization as a Chalmers agent offers a substantial, profitable, proposition to the right man.

Correspondence with substantial parties, looking to permanent affiliations is solicited.

Chalmers Oil Burner Co.
Minneapolis, Minn.
Member American Association of Oil Burner Manufacturers.

The E. and H. Automatic Control Valve

A new development in a valve for control of oil, for Oil Burning Equipment. Has distinctive features as well as simplicity, easily adjusted for both maximum and minimum control of the amount of oil required. Equipped with removable strainer and automatic shut off control. Both oil and shut off control levers adjustable to any position. Can be used on any type oil Burner where oil is fed by either pressure or gravity. Developed and tested by practical use by Efficient Engineers. Fully guaranteed. For prices and full description, write.

Pat. Pend. **Shipping Weight 5 pounds**

THE ECONOMY ARCH CO., Inc.
Manufacturers of Oil Burner Equipment,
2817 Lyndale Ave. So.,
Minneapolis, Minn.

Editorial

Two Candles on our Cake

WITH this birthday issue, FUEL OIL makes its prideful two-year-old bow. Each of the twenty-four issues in its lifetime has represented the maximum of effort on the part of the publishers to make FUEL OIL live up to its avowed purpose of furthering the use of fuel oil for heat and power. Care and caution have been foremost watchwords. We have tried to make each issue virile, living, with a message of value. Modesty forbids saying that our aim has been consistently reached. Letters from both our readers and advertisers indicate that a splendid interest in FUEL OIL exists. Circulation has increased since that initial issue a short two years ago, to more than eleven thousand; and the ever increasing number of advertising pages points to a growing appreciation of its great worth as an advertising medium. These conditions indicate that the magazine is approaching the fulfillment of its function.

During the third year of its life FUEL OIL wants to grow more than it has in the past two years; even as the popularity of the scientific burning of liquid fuel is sure to grow. It intends to become increasingly useful, and to continue to be the friend and advisor of individuals, firms, or forces interested in oil burning. It wants to serve and to exert every effort in behalf of its readers and advertisers. It will maintain the same high standards for both. There will be no wavering in its determination to offer only the best to its readers—both in editorial content and in advertising.

DEVELOPMENTS IN PORTABLE OIL BURNING EQUIPMENT

(Continued from Page 22).

its within the generating passages. In time this accumulation interferes with the operation of the torch and cleaning is necessary.

This type of torch does not have the adjustments of the other types and only clean kerosene or lighter oils can be used for fuel. It does have the advantage, though, of being entirely self-contained and can therefore be used any place. For this reason it has an unlimited field in plants not equipped with compressors.

It is encouraging to know that very recent investigation bids fair to entirely eliminate the troublesome carbon deposits. Other improvements are pending in this type.

Compressed Air Atomization

There are certain characteristics in the operation of a well designed pressure torch or burner which are hard to improve upon. For these, compressed air at a pressure of 80 or 100 pounds is used to force the oil to the burner and also break it up into a fine mist. Free air is induced to complete the combustion. A torch of this type gives a continuous, dependable flame, little affected by its position or height above the fuel supply. There is a thorough atomization and mixture of oil and air in the nozzle, further increased by induced air. Combustion is complete and efficient.

Probably the greatest single improvement on this type of torch or burner in recent years has been the automatic shut off valves. A flow of oil in excess of the normal capacity of the valves causes it to close and remain closed. This condition exists, for instance, when a pipe or hose line is cut or broken or a coupling fails, and in so doing prevents a dangerous spray of oil under pressure. These valves are standard on the best equipment and their use has averted many serious accidents. Willful efforts on the part of the operator to tamper with the safety feature and gross negligence on the part of employers in keeping equipment in repair has resulted in a few painful lessons by experience. We are glad to know that the number is almost negligible when considering the amount of equipment that is in use.

Few Accidents—Much Publicity

Publicity of a few rare accidents, nevertheless, has cast probably more than a just share of suspicion on the pressure burner and has attracted the attention of Safety First Committees who have made an insistent demand for that "ounce of prevention' which has brought about the latest development in oil burning—the safety vacuum principle.

This burner is so designed that a flow of compressed air through the nozzle of the burner, creates a vacuum in its oil chamber and by suction feed draws the oil into this same air current to be atomized. This principle eliminates the pressure from the supply tank and connections, and fire hazard to employees and plant is nil.

The only limitation imposed on this burner is the height above the oil supply at which it will operate. The theoretical limit is the pressure head equivalent to a perefct vacuum. For kerosene this would be 40 feet but the imperfect vacuum and friction losses in the equipment reduces this figure to approximately 15 feet in actual operation.

In other respects the operation is identical to that of a pressure torch—the same powerful and intense flame, instant lighting, wide range of adjustment from the long, soft, spreading yellow flame to the short, sharp, blue flame. The construction and operation is no more complicated and the outfit can be made and sold at the same price. This development, in progress by a number of oil burner manufacturers simultaneously, should do much to overrule one of the most serious objections to the use of fuel oil that they have had to deal with.

Another development worth mentioning in passing is special shaped tile linings for small forges and furnaces. Much of the effort of designing a good combustion chamber is wasted if care is not exercised in its construction. Too frequently inexperienced brick layers are careless and the result is that the burner is often censured when the fault is in the lining of the chamber. Tile lining insures a uniform product of predetermined correct proportions and the time and labor for replacement is almost negligible.

The number of oil burning vessels using the Panama Canal is constantly increasing. Of the steamers in transit through the canal during March, 1924, 282 burned oil, 117 coal, and three were fitted to burn either fuel.

Oil and Burner Companies Cooperate

Splendid examples of cooperative advertising by oil burner companies and oil companies have been exhibited in Minneapolis and St. Paul during the last few months. Educational and informative advertisements inserted by local burner and oil companies in the newspapers at regular intervals have done much to sell the residents of the Twin Cities the value of oil burning. One of the advertisements follows:

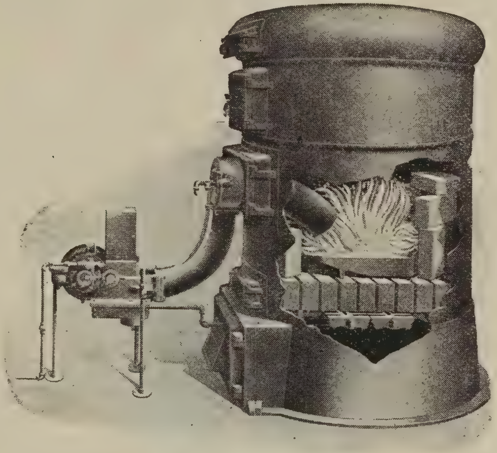
OIL HEAT
A Step of Progress

Just as the one-horse shay was supplanted by the high-powered motor car, and the tallow candle by the incandescent light globe, ordinary methods of heating are now giving way to strictly modern means of keeping the house comfortable and clean at all times.

The widespread adoption of Automatic Oil Burners in American Homes is but a natural step of progress.

OIL BURNER COMPANIES
Belden-Porter Company
Chalmers Oil Burner Company
Nokol Minnesota Company
Oil-O-Matic Minn. Corp.
Oil Equipment Company
Ordway-Cutler Company
Sundstrand Oil Burner Co.
Automatic Oil Heat Co.
OIL COMPANIES
Cities Service Oil Co.
De Laittre Dixon Coal Co.
Interstate Oil Co.
Midwest Oil Co.
Pyramid Oil Company
Petroleum Service Co.

Under an amendment to the Shipping act, recently approved by the Senate, the Shipping Board is authorized to spend $25,000,000 in equipping Government freighters with Diesel engines with a probability that they will be sold to private concerns.



ELECTROL

Electric Ignition Quiet Operation

Scott-Newcomb System
The Automatic Oil Burner

Positive Electric Spark Ignition

Quiet operation. Positive Pump Feed.
Four moving parts.
Air and Oil Separate—Not Integral.
Capable of definite adjustment.
Listed as Standard by Underwriters Laboratory.

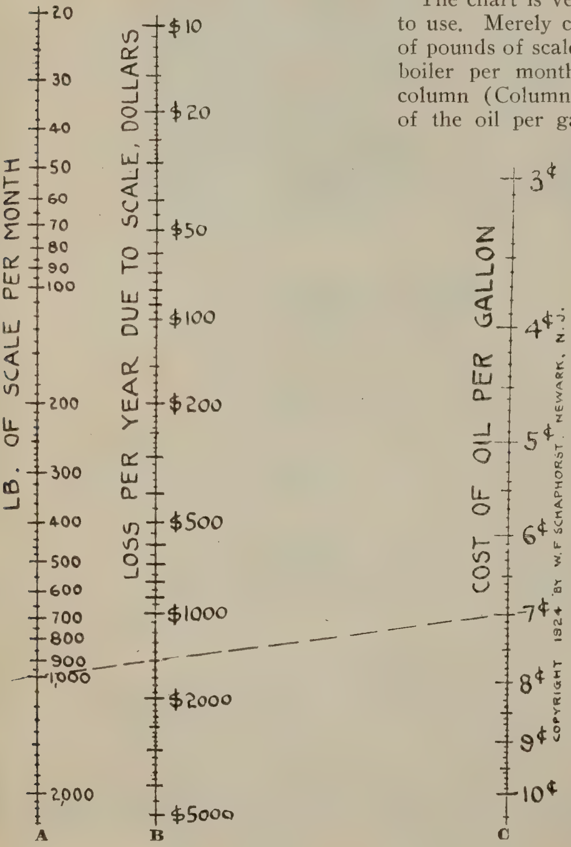
Desirable unassigned territory available

HOME APPLIANCE CORPORATION
2818 LOCUST STREET ST. LOUIS, U. S. A.
Member American Association of Oil Burner Manufacturers

The Cost of Boiler Scale

Nearly everybody knows that scale in a boiler is expensive. Not enough of us realize, however, how expensive it becomes in a year.

The accompanying chart has been developed with a view to emphasizing the importance of keeping boilers free from scale—in other words to drive home the fact that boilers should be kept clean.



The chart is very simple and easy to use. Merely connect the number of pounds of scale cleaned out of the boiler per month in the left-hand column (Column A) with the cost of the oil per gallon (Column C) and the intersection through Column B gives the annual cost of the fuel lost per year.

For example, if you clean 1000 pounds of scale out of your boiler, or boilers, per month, and if the cost of your oil is 7c per gallon, the dotted line draw across the chart shows that the loss per year due to scale is $1,500. As will be noted the dotted line conncets the 1000 pounds in Column A with the 7c in Column B gives the answer as $1,500.

Gill Oil Burner

THE "grief" period for oil burner dealers and users ended with the introduction of the Gill oil burner.

Here is extreme simplicity, absolute certainty of operation, compactness and low cost in an automatic **Fuel** oil burner.

This truly domestic oil burner, plus Gill reputation for Products of Quality and Service are the very biggest things a dealer can have. Write or wire.

GILL MANUFACTURING CO.

8300 South Chicago Ave, CHICAGO

An Advertiser Wrote:

> *"I am highly pleased with the results of the half page I ran in Fuel Oil. To date, only three weeks after the first advertisement appeared, I have received inquiries about my pump, all of them mentioning Fuel Oil."*

An Advertising Agency Wrote:

> *"We are preparing and will forward to you in due time a full page in color for our client, having in mind the matter of obtaining additional dealers through the use of Fuel Oil. For your information, they have obtained some very good results even from the insufficient copy they have been running."*

A Reader Wrote:

> *"I am a civil and mechanical engineer and want to say that your magazine is the best of its kind I have ever read, and I am reading constantly, and have been for the past ten years. More power to you."*

This space is available for 12 issues in color at an unusually attractive rate for preferred position. If you would like the story of your product to dominate the magazine, wire or write for the reservation.

FUEL OIL

For Heat and Power

Home Office
Galesburg,
Illinois

Chicago Office
20 E. Jackson Blvd.
Harrison 5240

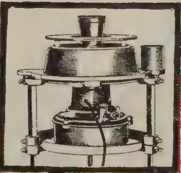
Use
an
ABC

Only Live Dealers Wanted

Drones and promisers would not be at home in our dealer sales organization. But there is a type of sales executive who will find in an A B C exclusive agency what he has been looking for. Is it you? Have you the ability to uphold our slogan, "The fastest selling oil burner?" Then why not let us send you the profit-indicating facts?

ABC OIL BURNER
no noise ~ no carbon

Automatic Burner Corp.
312 No. May Street
Chicago

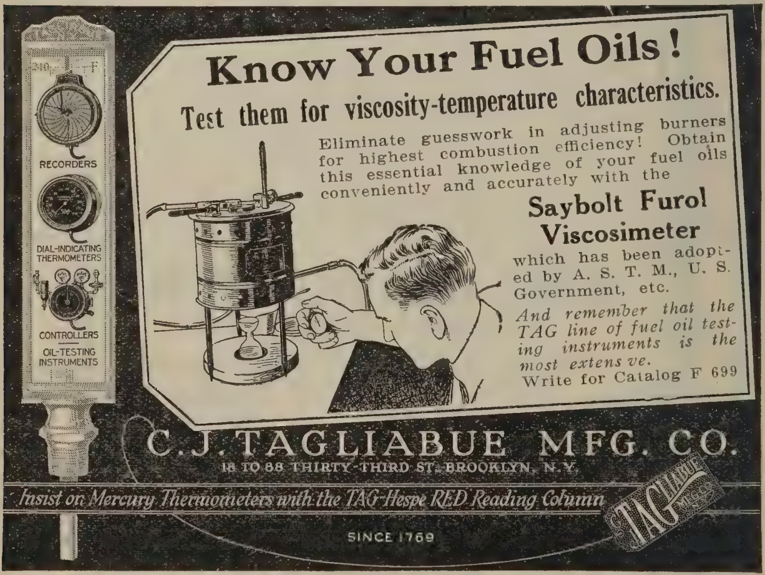


Kansas City Firm Issues Pamphlet

The thoughts of the prospective oil burner buyer are directed to the coming winter in a booklet issued by the Ad-Justo Oil Burner Company, Kansas City, Mo. The Ad-Justo is a pre-heating, natural draft burner, the preheating being accomplished by running the oil through a U-shaped tube inverted over a burner valve from which the gas issues into the combustion chamber. The valve can be adjusted for low or high flame by a regulator that is controlled by a chain which extends from the basement to the baseboard of one of the rooms above.

New Device Heats Air Supply

The Combustion Engineering Company, New York, has lately begun installing a new device, the C. E. C. Air Heater, attachable to any type of furnace, which employs the otherwise wasted flue gases to heat the air draft before it is admitted to the furnace to aid in the combustion of the fuel. The air is drawn by a fan through a number of flue-like apertures into a chamber through which the heated gasses pass, thus absorbing some of the heat. A higher efficiency is obtainable from a furnace thus equipped according to the literature issued by the company.


Know Your Fuel Oils!

Test them for viscosity-temperature characteristics.

Eliminate guesswork in adjusting burners for highest combustion efficiency! Obtain this essential knowledge of your fuel oils conveniently and accurately with the

Saybolt Furol Viscosimeter

which has been adopted by A. S. T. M., U. S. Government, etc.

And remember that the TAG line of fuel oil testing instruments is the most extensive.

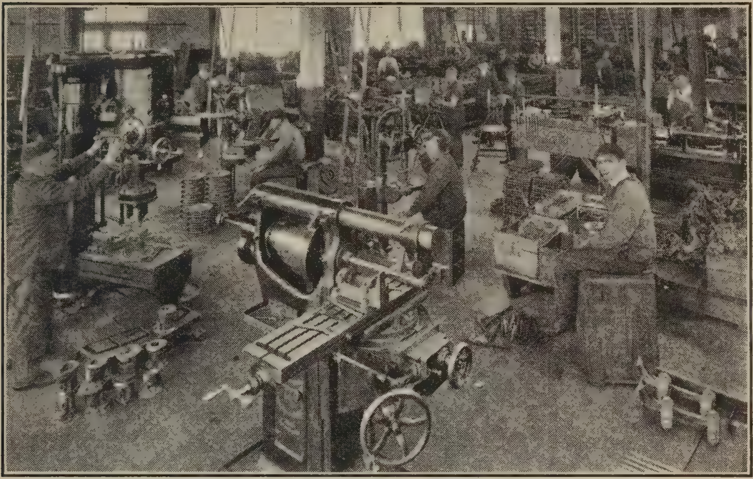
Write for Catalog F 699

C. J. TAGLIABUE MFG. CO.

18 TO 88 THIRTY-THIRD ST., BROOKLYN, N. Y.

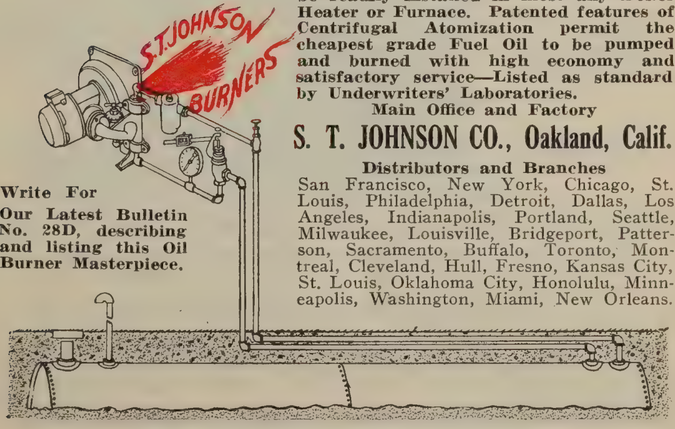
Insist on Mercury Thermometers with the TAG-Hespe RED Reading Column

SINCE 1769



This Photograph shows a portion of the Modern Daylight Factory of S. T. Johnson Co., Manufacturers of Oil Burning Equipment exclusively for seventeen years.

Improved Rotary Type 22



This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—And Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

Main Office and Factory

S. T. JOHNSON CO., Oakland, Calif.

Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Patterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, St. Louis, Oklahoma City, Honolulu, Minneapolis, Washington, Miami, New Orleans.

Write For

Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.

Making Gas From Distillate

Muncie, Indiana.

Editor, **Fuel Oil:**

In the April edition of **Fuel Oil,** Volume 2, No. 10, there is printed on page 20 an article headed "To Utilize Distillate for Gas".

We would be very grateful if you will furnish information as to the location and name of the firm that manufactures the apparatus mentioned in the above article.

L. P. S.

The apparatus mentioned in the story you speak of has been perfected and is being manufactured by the Orgasco Company, Niagara Street, Buffalo. New York.

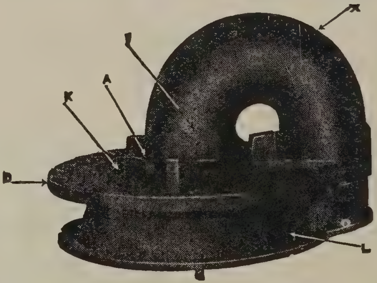
Diesel Engines Show Saving

In a paper recently read before the Institute of Engineers and Shipbuilders of Scotland, James Richardson stated that comparative operating costs of a Diesel driven ship over a steam driven, each using 1,000 B. H. P., show a saving per year, in favor of the Diesel driven vessel of £5,570, when coal is used and £12,650, with oil as fuel.

Burn Oil To Protect Fruit

Between $500,000 and $1,000,000 worth of petroleum products are burned each winter in southern California to keep the orange crop from being frostbitten. From 12 to 25 trainloads of tank cars filled with smudge oil are used between November 15 and February 29 each year. The oil is burned in small heaters which are placed in rows between the trees. The combustion produces a heavy smoke which hangs low over the groves and keeps the air warm.

The White Flame



Liberty Oil Burner

Throws the Flame out against the side of the Fire Box

The **Liberty Burner** is **Made Right** to **Heat Right—Quiet** in operation. **No Soot** or **Carbon** to cause Servicing after installation of Burner. Thousands of Satisfied Users.

Successfully operated by Thermostic Connections.

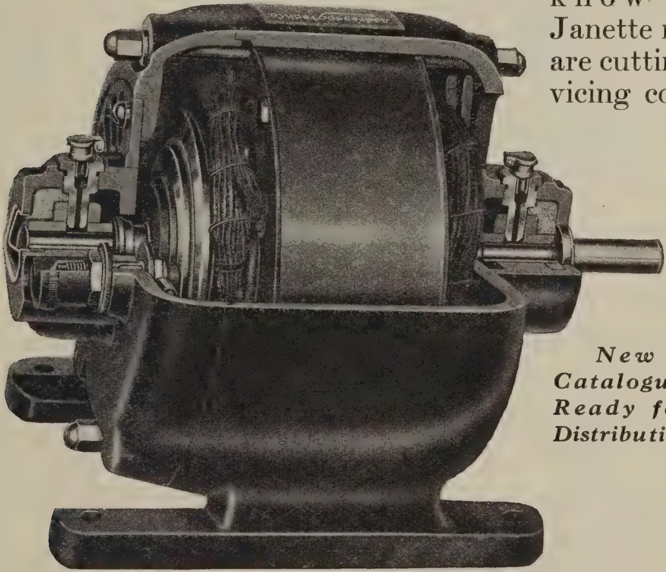
Sold only through reliable Dealers and Distributors, at very Liberal Discounts. "Years in Successful Use."

Liberty Oil Burner Co., Inc.
Douglas at 8th St. Omaha, Neb.

Special Motors for Oil Burners

Manufacturers who are using Janette motors realize the value of a motor which has been developed for Domestic Oil Burners. Designed and engineered by men who have made extensive study and as a result they have perfected a special Motor for Oil Burners.

If you manufacture a motor driven unit, you should know why Janette motors are cutting servicing costs.



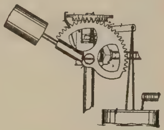
New Catalogues Ready for Distribution

Cut-away view of Janette Motor

Janette Manufacturing Company
556-558 West Monroe Street
Chicago

NEW YORK
SINGER BUILDING
149 BROADWAY

PHILADELPHIA
439 REAL ESTATE
TRUST BUILDING



SAFETY FIRST
A Regulating and Automatic Cut-off Valve Combined.
Prevent danger of Fire and loss of Oil. Easy to install. Equipped with union.
Write for literature
DEALERS WANTED
DUTY MFG. CO.
1417 E. 9th, Kansas City, Mo.

Aeroil Burner Co., Inc.
Union Hill, N. J.
Manufacturers of
Portable Oil Burners for heating
Pitch and Asphalt Kettles
Oil Burning Asphalt Kettles
Lead Melting Furnaces
Kerosene Blow Torches
Good Sideline for Oil Burner Salesmen

Over 2,000 Worthington Burners in Greater Kansas City

Dealers have been appointed in 25 principal cities—We are now beginning our eighth season.

Exclusive dealers are now being appointed in cities where we have no representation. Write us to-day for dealer's proposal and quotations. Dealer quotations made to responsible concerns only.

Worthington Oil Burners
1322 McGee St. Kansas City, Mo.

ELECTRIC IGNITION AND CONTROL FOR OIL BURNERS

(Continued from Page 11).

ing to pay a premium for the privilege of having greater comfort and ease. Therefore, in our scramble for sales let us not lose sight of the fact that we must build for convenience.

In drawing comparisons between the oil burner and automotive industries we find many points of similarity that should help in the development of the former. The automobile of today is the product of very intensive thought and research which, up to the present at least, cannot be said of the oil burner. Basically both machines are used for making heat. Oddly enough, it was not until the automotive engineers realized that the engine was a heat machine that real progress was made in ignition.

Much Electrical Equipment

Aside from the motor used on an oil burner, the electrical equipment consists of a thermostatic circuit with relays and electrical ignition apparatus. There are several methods commonly used to project the burner in the event of failure of any of the major parts. The layout of the relay system depends upon which method is used.

The first step in automatically starting the burner is when the house thermostat closes a relay circuit through the secondary coil of the transformer. This relay circuit in time closes the motor circuit if a motor is used. As soon as the motor starts operating the ignition coil starts also. It is protected by a

TANKS

FOR FUEL OIL

Morrison fuel oil tanks represent the highest type of construction. To know a tank is Morrison-made is to know it has no superior. Far more important than the mammoth, modernly-equipped factory in which it is produced, is the skill and pride in perfect execution of the Morrison craftsmen who build it. Before shipment, every Morrison tank must withstand rigid inspection and tests. It must possess Morrison quality before it is given the Morrison name.

Absolutely leak-proof, trouble-free and backed by the Morrison guarantee, you can install a Morrison fuel oil tank with the full assurance that it will deliver the uttermost of faithful service.

Fuel Oil Accessories

The Morrison line includes everything you need for fuel oil tank installations, including:

Fill Caps,
Vents,
Pumps,
Gauges,
Line Valves,
Bushings, etc.

Write for literature and prices

Morrison Bros.

"OIL EQUIPMENT HEADQUARTERS"

DUBUQUE, IOWA

thermostatic switch or by a dash pot switch, either one of which keeps the coil circuit closed for a pre-determined period, usually about 30 to 40 seconds. When the atomized oil is ignited directly by the electric spark this completes the starting operation. The great majority of the manufacturers, however, are still using gas ignition for the oil.

Protects Burner System

The burner system must be protected against two possibilities for failure to function; first, the failure of the oil to ignite, and second, the failure of the house thermostat to open the circuit when the temperature rises to the proper point. While many manufacturers use the overflow oil pan method of tripping a switch, to open the motor circuit, others are having great success with the flue thermostat which, in ordinary operation, will trip a switch if the flue temperature does not rise to a certain point within a pre-determined period. The method ordinarily used to protect the flue against overheating is the insertion of a thermostat in the steam, hot water or warm air system. This thermostat is set at some point above the normal operating temperature of the boiler, and will function in case there is something wrong with the house thermostatic circuit.

These later types of control contemplate regulating the furnace temperature between certain extremes. In all such devices current is supplied by means of a step-down transformer which is connected to the house lighting circuit.

The oil wick and gravity feed types of burners can make use of electrical ignition as well as the atomizer type. Any ignition that can be accomplished by an oil or gas torch or other device can also be handled by an electric spark.

Has Important Sales Value

From the sales standpoint the ignition problem is of considerably more importance than most burner manufacturers are aware. While they are congratulating themselves that the oil burner industry seems to be following in the footsteps of the automotive industry, they should realize that it is only by giving ab-

TANKS
ELECTRIC WELDED
FUEL OIL GASOLINE AIR
WELDED PIPES AND PIPE LINES
SMITH--HAMBURG--SCOTT
WELDING
CO.
OF N. Y. INC.

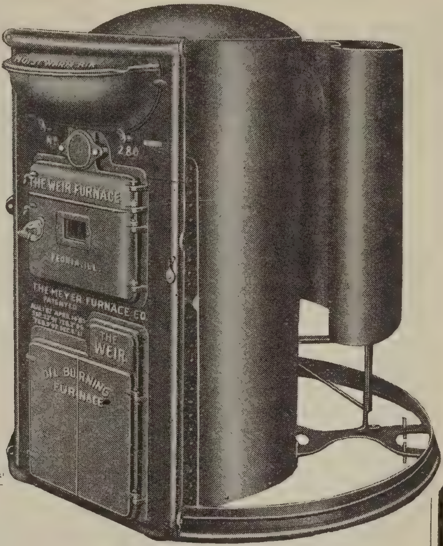
Tank Plant
Marion St. and Harris Ave.
Long Island City
New York

Office and Shops
505 West 57 St.
New York City

Get the Facts About the

WEIR

Oil-Burning Furnace



It is generally conceded that satisfactory results from an oil burner depend largely upon the heating plant in which it is installed, and it is becoming more and more generally a recognized fact that all makes and types of furnaces do not prove satisfactory. Hence there is an increasing demand for an oil-burning warm air furnace.

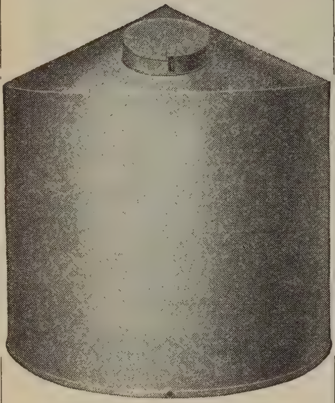
The WEIR is the one furnace **proven** satisfactory for oil burning.

Get the facts---Write for complete information

The Meyer Furnace Co.

Peoria, Illinois

FUEL OIL TANKS



Vertical or Horizontal

65 to 35,000 gallons

Built by expert workmen. Tested under air pressure. Guaranteed oil tight. Immediate delivery. Write for prices and specifications.

Standard Steel Works

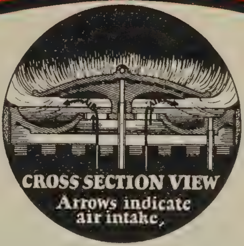
1606 Holmes Street,
North Kansas City, Mo.

solute assurance of automatic control that they can expect to reach that degree of perfection which will command the same approval that has been extended to the automobile.

Probably the largest percentage of complaints from the improper operation of the household oil burners come during the late fall and early spring months when the weather is not very cold and when the oil burner must be turned off and on and up and down frequently during the course of the day. At such times a failure to ignite or to properly regulate will bring about results that will very seriously affect oil burner sales. It is evident that such a condition cannot continue for it will keep oil burners out of some territories altogether. In some sections of a country where natural gas is relied upon for the pilot flame, the uncertainty of operation is almost as great as in sections of the country where continuous heat is out of question. In most of these instances, electric ignition as well as operation will open up territories which would otherwise remain closed to burners.

New Folder on Aeroil Equipment

Several types of heaters for pavement patching kettles, together with a number of torches for industrial uses, are shown in the new folder on portable oil burning outfits manufactured by the Aeroil Burner Company, Union Hill, New Jersey. The units are made with small tank capacities and hand pump compression equipment.



CROSS SECTION VIEW
Arrows indicate air intake.

The SUN Wins by Comparison

It is quite significant that many experienced dealers who have handled other makes of oil burners are now representing the SUN. Why?

Note these exclusive features:

Can be controlled by thermostat without gas pilot light.

Low Installation Cost.

Low Fuel Cost.

Low Operating Cost.

Minimum Servicing.

Easy to Install.

There is no easier burner to sell. Few are so simplified and efficient. Thousands of users bought after making comparisons with many other types. All pronounce it a most practical, dependable and economical burner.

Investigate. Send name for new illustrated catalog. It's FREE.
Write today.

THE HEAT EQUIPMENT CORPORATION
134 S. 13th St., Lincoln, Nebr.

HEAT EQUIPMENT CORP.
134 SO. 13TH ST.
LINCOLN, NEBR.
KINDLY SEND COMPLETE INFORMATION ABOUT YOUR SUN OIL BURNER, INCLUDING PRICES TO DEALERS, ETC.
NAME____________________
ADDRESS____________________

The Sun
AUTOMATIC
OIL HEATER

THE IMPORTANCE OF FUEL OIL SPECIFICATIONS

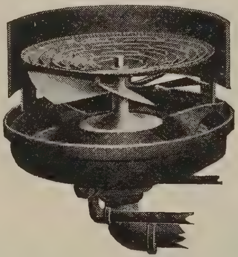
(Continued from page 10.)

fact seldom necessary, that the burner be a purchased burner in order that it atomize the oil, although purchased burners are usually more efficient than home-made ones. Plants not equipped to heat the oil are necessarily confined to the lighter oils, but if any quantity of oil is used it is generally cheaper to provide means for heating. Even in these plants a saving can be made by using a lower grade of oil in the summer than in the winter.

Large consumers of fuel oil are gradually re-vamping their systems to enable the use of heavier oil. This is not as expensive as it would first appear and usually pays for itself within a very few months. The expense will have to be made sometime and once made, the trouble contingent with the burning of oil, will be over. The plants not equipped to deliver clean hot oil to the burners, or unload heavy oil, are attempting to handle the fuels of today with the tools of yesterday.

Should Keep In Good Condition

It is not enough merely to provide means to heat and strain the oil, but also necessary to keep the burners themselves in good condition. An oil burner is one of the most neglected articles in a plant and is repaired only when it fails to perform. In the interim between good condition and utter failure it may waste its weight in



Rotary Oil Burners

Smokeless---Sootless and Safe

Whether your need for heat is commercial or for use in the home the ROTARY BURNER will serve you. It is built in every size to meet every demand.

The Rotary entirely consumes the fuel, there is no overflow of oil possible, making for safety. Because the oil is broken up and the right amount of air is thrown in with it, it produces a high temperature blue flame. Complete combustion means No Smoke or Soot

It will operate on cheap fuel oil of 26 gravity.

Write today for details.

ROTARY MANUFACTURING COMPANY

1526 Santa Fe Avenue Los Angeles, Calif.

Established 1908 Handled by distributors
Chicago, St. Louis, San Francisco, Oakland and others.

TRADE Leader MARK

Underwriters' Underground Storage Tanks

Shipped from Stock

LEADER-BUILT Underwriters' storage tanks are made better than the specifications as laid down by the Underwriters' laboratories.

It is a good policy to install a leak-proof tank with each FUEL OIL burner installation. Why take a chance on ruining the reputation of a FUEL OIL burner because of a leaky tank?

LEADER Underwriters' underground storage tanks are built in sizes ranging from 200 to 5000 gallons capacity.

Send for Special Bulletin and Price List No. 10

LEADER IRON WORKS, *Decatur, Illinois*

PARCO

34-36 Amber Gas Oil 38-40 Light Straw Distillate are without peer in their respective classes.

Refined in our three modern refineries and transported to your storage in our fleet of tank cars.

Ask our nearest sales office for quotations.

PRODUCERS AND REFINERS CORPORATION

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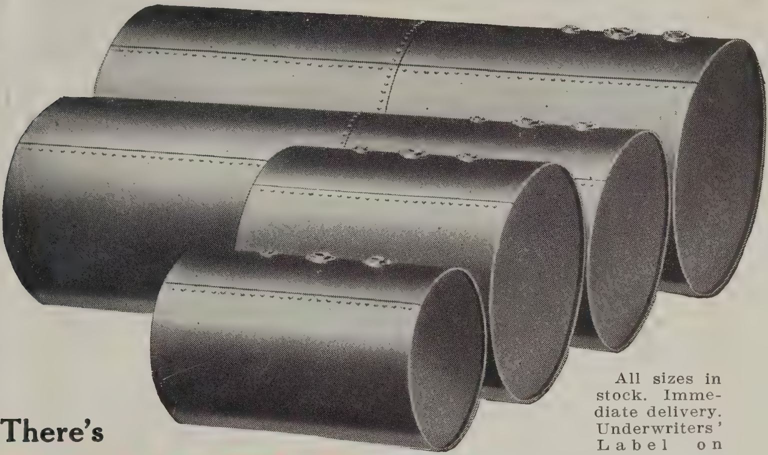
PARCO PETROLEUM PRODUCTS

GAS OIL *and* DISTILLATE



All sizes in stock. Immediate delivery. Underwriters' Label on tanks.

There's

Grief in Oil Burners

When the Tanks are Poor!

Poor tanks cause most oil burner trouble. They rust and scale. Their rapid deterioration is very costly. Even the best oil burning system can't possibly overcome these defects.

The way to successfully operate your oil burner is to have the oil fed from MILWAUKEE "Kant-Leek" Tanks galvanized every inch inside and out with pure zinc spelter. They CAN'T rust. They CAN'T scale. They CAN'T leak. Insist on the MILWAUKEE "Kant-Leek" for these important features and their non-depreciating value. Fully guaranteed Quality fittings with each tank. Write TODAY for prices.

DEALERS: Attractive proposition that spells P-R-O-F-I-T-S. WRITE!

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Immediate Shipments from nearest Warehouse

New York
Cleveland
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London
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PLAY SAFE

MILWAUKEE TANK WORKS
MILWAUKEE, U.S.A.
MILWAUKEE
MANUFACTURERS OF OIL PUMPS AND TANKS

Insist on the
MILWAUKEE
Galvanized
"Kant-Leek" Tank
Riveted, Welded and
Hard Soldered

OVER 600,000 MILWAUKEE KANT-LEEK TANKS IN USE

FUEL OIL

GAS OIL

In 1922

we started out with

3 DESKS

and a few Prospects

Today we occupy 17 DESKS and have a list of Customers that would be a credit to any marketer in the Country ~ all of which proves that

The basis of unusual success is unusual service

STABILITY
SPENCER
SERVICE
OILS
SATISFACTION

SPENCER PETROLEUM CO.

"Conscientious Oil Marketing Guided
by Years of Experience"

All Petroleum Products

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Peoples Gas Bldg.
Harrison 9630-1-2-3-4

KANSAS CITY
700 Orear-Leslie Bldg.
Harrison 6180-6181
Long Distance—65

TULSA
1039 Kennedy Bldg.
Osage 857
Long Distance 37

DETROIT
743 Book Bldg.,
Cadillac 8864

WICHITA FALLS
Waggoner Bldg.
Phone 2152

KEROSENE

GASOLINE

V.3

FUEL OIL

FOR HEAT and POWER

Devoted to developing and encouraging the efficient, scientific use of oil fuels.

Published Monthly

Vol. 3 August, 1924 25 No. 2

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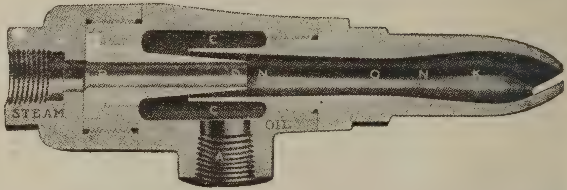

"A"-Oil Inlet. "B-D" Steam Nozzle. "C-C" Oil Heating Chamber. "NON" Nozzle forming a venturi tube, with throat at "O." "K" Chamber where Oil and Steam are churned into an Emulsion—previous to ignition.

Airoil Burners

use only 1½% of steam generated for operation

They use any grade of Fuel Oil. Will not Flare-back or Back-fire. Eliminate Carbon deposits and Smoke. Contain no needle valves, which are likely to clog-up, or drip.

Operate with an Oil Pressure of only 30 lbs. and an Oil Temperature of less than 150 Degrees F. They require no attention in service.

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The Water Tube Boiler Fire Box Design

By C. C. Hermann

THERE are three distinct types of water-tube boilers that possess many mutual characteristics, yet they have many problems in connection with fire box design for fuel oil burning that must be considered separately. In general these boilers are made up of tubes connected to headers and drums with the water and steam on the inside and the gases of combustion flowing against or along these elements on the outside.

High Pressures May Be Carried

The drums are not subjected to the high temperatures of the combustible elements as is the case with the horizontal tubular boiler; therefore higher pressures may be carried. Also, due to the fact that the drums may be made smaller and the arrangement of the tubes may be varied to suit requirements, these boilers may be designed to occupy much smaller spaces for similar capacities than is the case with the horizontal return tubular boiler.

The Horizontally Inclined Boiler

The first type we will consider is the horizontally inclined water-tube boiler. Prominent among boilers of this type are the Babcock & Wilcox and the Edge Moor. The Babcock & Wilcox Company makes two types of these boilers; one having the drums placed horizontally and longitudinally with the tubes and the other having the drums located directly above the downtake header and across the tubes. In the longitudinal drum type the water tubes are secured at their ends into headers which connect with either end of the drum. The circulation of the water within the drum and tubes is counter to the circulation of the products of combustion, the downtake being at the rear end of the drum and into the rear header, thence through the tubes to the forward

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header and into the forward end of the drum. In the cross drum boiler the circulation is down at the forward end of the setting by means of the forward header, then upward through the water tubes toward the rear, through the rear header and then through longitudinal tubes to the drum at the front. The circulation is shown in Figures 1 and 2. Great difference between the Edge Moor boiler and the cross drum type of the Babcock & Wilcox boiler is in the location of the drum. In the Edge Moor the cross drum is located directly over the downtake, which is at the rear, bringing the water circulation counter to the flow of the gases of combustion. The Edge Moor also make a longitudinal drum boiler which differs with the Babcock & Wilcox in that the header at both ends of the boiler extend above three drums.

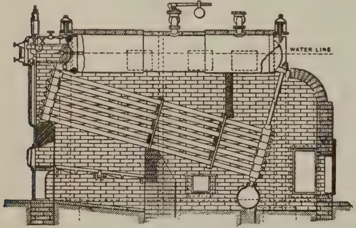

Fig. 1

Other manufacturers of horizontally inclined water tube and horizontal drum boilers are the Casey-Hedges Company and Connelly Company. The Erie City, Keeler, Murray, O'Brien, Springfield, Union Iron Works, and the Heine boilers are also of this type. In the latter the tubes are parallel with the drum, the whole inclining towards the rear of the setting.

In most installations the furnace is located beneath a portion of the tubes so that these tubes are within direct radiation of the fuel bed. The gases of combustion are either directed across the tubes, making from three to four passes vertically, or they are directed along and parallel with the tubes, making two or three passes horizontally. In order to obtain these passes, either vertical or horizontal, baffles are installed to direct the gases along the desired path.

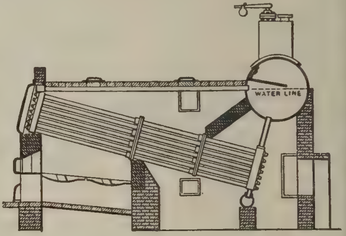

Fig. 2

In Figure 3 is shown the Babcock & Wilcox Boiler equipped with a Peabody oil burner. This setting is provided with two vertical baffles causing the products of combustion to flow directly across the tubes and make four passes on the way to the uptake.

Baffle construction to meet the ever increasing demand for higher pressures and greater capacity from the boiler presents a problem that has never been entirely solved. The vertical baffle has

(Continued on page 72.)

Oil Burner an Advantage in Laundries

By Victor A. Spoehr *

AN excellent opportunity to prove the merits of the oil burner has been found in the laundry field. Due to the increased popularity of the wet wash system in the past few years, laundries in general have found their boilers greatly overloaded. The purchase and installation of additional boilers and equipment involved so great an expenditure that many owners decided to "take a chance" with oil burners on the boiler room equipment already in use. Increased boiler capacities ranging from 100 to 150 degrees above makers' ratings have been quite common, and if for no other reason than that, the oil burner has proved itself to be an advantage in laundries.

There are two ways to overcome the varying boiler load problem such as is encountered in laundries: one is to keep the same number of boilers in constant operation and force them during the peak; the other, the more costly one of firing up extra boilers each time the load climbs, wasting both heat and time in warming the settings. Elasticity of oil burner operation makes the first easy and efficient, and the second seldom necessary.

In the laundry field there are always varying loads and for such duty an automatic boiler control is necessary. Such a device must be positive in action, gradual in operation and preferably not electrical. Its operation is governed by the boiler pressure, but it should be carefully adjusted so that combustion is proper under all conditions. A stack gas analysis should be made when the boiler pressure is increasing, decreasing, or remaining steady. Such a controlling device permits the engineer to perform repair and maintenance work about the plant. Another advantage with such a control is found in the fact that operation will be decidedly more efficient if the boiler pressure is constant than if it varies.

Burners or nozzles should always be installed in multiple, as this spreads an even blanket of heat, avoiding any cold pockets or corners. The burners themselves seem to perform better when in a battery, and can be cut down to a lower degree without the danger of a "flareback." Furthermore, when so arranged the original raising of steam to

(Continued on page 68.)

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* Ryerson-Crane Company, Chicago.

A. A. O. B. M. Convention To Chicago

The next annual convention of the American Association of Oil Burner Manufacturers will be held in Chicago, early in April, 1925. This was decided at a meeting of the association's board of directors at the Congress Hotel, Chicago, July 8, following an invitation extended by John Bowman of the Chicago Association of Commerce.

The board of directors arranged for the drawing up of an amendment to the association's constitution, providing for the creation of a dealer's division. The amendment will be submitted to the association for endorsement at the 1925 meeting. This new division will make the association more representative of the whole oil burning industry. It is expected that the work of the dealer's division will include keeping all dealers informed on association developments and methods used in various phases of the industry.

Tentative plans were discussed for future national advertising activity in cooperation with the American Petroleum Institute and various oil trade associations, but no definite action was taken.

Folder Gives Pressure System's Merits

Advantages of pressure systems for hot water heating plants in general, and of the Honeywell Heat Generator in particular, are pointed out in a folder recently sent out by the Honeywell Heating Specialties Company, Wabash, Ind. It is shown, in the folder, that a slight pressure speeds up the circulation of the hot water and gives quicker and more efficient heating results and that less fuel and water is used. Also fewer pipe fittings and valves are necessary to complete the system.

Fess Booklet Shows Burner Advantages

"Bring Florida to Canada" is the admonition to prospective customers carried in a booklet that has been published by the Fess Oil Burners of Canada, Ltd., Toronto, manufacturers of the Fess Burner. The convenience and comfort of oil burners as compared with most coal burning furnaces are pointed out and illustrated with drawings. The Fess Burner, which is an automatic, is also described and the several features that make it desirable for home heating enumerated. Atomization is accomplished in the Fess when the oil is introduced into a whirling cup from which, by centrifugal force, it is thrown in a fine spray. The flame is in the form of a circle.

Universal Corporation Still In Detroit

The Universal Automatic Oil Burner Corporation, formerly the Petroleum Heat and Power Company of Michigan, has not moved its offices to New York City, as was stated in the June issue of **Fuel Oil**, but still maintains them at 238 Larned Street, Detroit, Mich.

Measurement of Materials in Heating Plant Operation

By J. M. Spitzglass *

ALL fluid measuring devices consist of two major parts; one is the primary element which comes in contact with the fluid and is acted upon by its motion; the other is the secondary element which translates the action of the fluid upon the primary device into rates of flow, weights and volumes respectively.

The primary device may consist of a pitot tube or an orifice plate, inserted into the pipe for the purpose of obtaining a differential pressure, which is used as a criterion of the rate of flow through the pipe.

The secondary device may be a simple U - tube gage, or Manometer, which balances and indicates the differential pressure produced by the primary device, or different medium. In the commercial meter the secondary device translates the differential pressure into arbitrary units of flow.

Where formerly it was the custom to operate boilers without instruments, except for steam guages, it is now customary to install steam-flow meters, air and water meters, and any other device which measures the flow of material that helps regulate the efficiency of the plant. Installation of such devices has been known to pave the way for increasing the efficiency of some plants as high as 15 per cent.

The principle of measuring fluids by means of a differential medium was well known to students of hydraulic engineering long before the advent of the flow meter as a commercial article. The principle has been applied in colleges and laboratories in tests with weirs, venturi tubes, pitot tubes, nozzles and orifices.

Naturally, in the case of a laboratory or college test, there was little trouble experienced in obtaining the true pressure difference corresponding to a given flow. In each case the piping was properly designed to fit the particular conditions. Leaks in the piping, air or water bound extensions were carefully eliminated from the connections. Gages were read with laboratory precision so that there could be no doubt in the results.

The application of similar devices for practical purposes is a comparatively recent but very comprehensive development. The present state of the art is such that an orifice can be designed to give a definite pressure difference for a very wide range of flow under any condition of pressure or temperature. The experimental work has been carried to a point where the orifice can be depended upon to give results accurate within a fraction of a per cent. In fact, the experimental work has been so carefully performed that, in every day practice, inaccuracies caused by errors of observation are greater than those due to errors in orifice calculations. The secondary element, that is, the indicating or recording portion of the meter, will record a rate of flow, or total flow, corresponding to a definite differential pressure with very great accuracy. Both the orifice calculations, or rather orifice data, and the recorder construction, are dependent upon the meter manufacturer. Fortunately, these two things have been developed to a very high stage.

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* Vice-President, Republic Flow Meters Company, Chicago.

From the Iron and Steel Electrical Engineer.

Meter User Controls Pressure

The connecting link between these two parts is the connecting piping from the high and low pressure sides of the differential medium to the two connections of the secondary element. This element, whether a Manometer or Meter Body, will be actuated by the pressure difference delivered, whether this is the actual pressure produced by the differential medium, or a pressure modified by faults in the piping. This is one matter that is dependent to a large extent upon the meter user and is the cause of the majority of meter troubles.

Thin Plate Orifice Preferred

For the purpose of fluid measurement in the boiler room, the thin plate orifice is much preferred to the pitot tube, because of its higher accuracy and its adaptability to various quantities of flow. New installations should be designed to allow sufficient length of straight pipe and provide proper flanges for insertion of orifice plates in every pipe line to and from the boiler room. It should be borne in mind that a pipe line without a provision for a differential medium is one of the greatest obstacles in the path of efficient operation in the boiler room.

In old installations, where the piping conditions are not suitable for the insertion of an orifice plate, a pitot tube may serve the purpose, provided there is sufficient straight pipe in front of it (6 to 10 pipe diameters.) In cases where the maximum flow cannot be estimated, it is well to insert the pitot tube to obtain the data for determining the size of the orifice.

The proper installation of an orifice plate in a given pipe requires the consideration of the following items:

1—Size of orifice. (Orifice ratio.)

2—Location of orifice plate.

3—Proper spacing of pressure taps.

4—Pressure connections to

gage. (Or commercial meter.)

The supply of air to the furnace presents a problem which does not lend itself to a direct solution. It differs greatly from the measurement of the other fluids because the air seldom passes through definite channels on its way to the combustion chamber.

It has been stated repeatedly by authoritative persons that the air supply may be determined by measuring the differential pressure between two given sections of the boiler along the path of the products of combustion. The theory is that the resistance to flow is a criterion of rate of flow in the same manner as the pressure difference produced by an orifice or other differential medium in a pipe.

It is rather difficult to accept such theories when we consider all of the precautions previously recommended for other measurements. The laws of physics hold true that the inertia of the fluid is proportional to the velocity squared times the density. The density is a function of the temperature and composition of the gases. It varies to a large extent as the products of combustion pass from one section of the boiler to the other. That is, the density varies considerably between the two points at which the two pressures are obtained. The velocity is a function of the same varying density and also of the areas of the passages, which may vary from the continuous accumulation of soot and dirt on the tubes. The impact, as I stated, represents this velocity squared times the density, and it is very doubtful to my mind whether we can base operation on an index that is affected by such indeterminate quantities. If we add to this the possibilities of leakage in the setting, the possible infiltration of air over the fire, which may also be a variable quantity, the possible changes in the fuel and in the condition of the fuel bed, we must come to the conclusion that if we desire to measure the air consumed in the combustion of the fuel we must provide proper channels for the supply of the air to the combustion chamber. If this is impractical, it is best, in my opinion, to use a direct method of determining the quality rather than the quantity of the gases leaving the boiler. A continuous

(Continued on page 64.)

The Consulting Department, the latest addition to **Fuel Oil's** *editorial program, will be found on Page 61 of this issue. Through this department we shall answer the most timely and interesting of the many inquiries on oil and oil burning we receive each month, giving all our readers the benefit of this information. Any one who receives the magazine is privileged to come to us for his information if, in view of the small space available, he will make his questions as short as possible.*

Government Buildings to be Heated with Oil

By Arthur G. Winkler

ELEVEN government buildings in Washington, D. C., will be heated with oil next winter if plans now being made by the superintendent of public grounds and buildings in that city are carried through. The plans call for the installation of oil burning equipment in one large central heating plant, which, upon completion, will probably be the largest installation of such apparatus in one plant in the world.

The floor space of the eleven buildings, in which are included the Navy and Munitions building, which has 3,000 rooms and is one of the largest office buildings in amount of floor space in the world, and the Department of the Interior Building, which has 1,500 rooms, will aggregate 3,400,000 square feet.

Oil Contract Already Signed

It is estimated that 215,000,000 pounds of steam will be required each year to keep the buildings at the desired temperature and that 51,000 barrels of fuel oil, navy specifications, will be consumed to produce the steam. A contract has already been signed with the Standard Oil Company of New Jersey for the oil and it is planned to anchor a 40,000 barrel tanker in the Potomoc River, conveniently near the boiler room, in which to store the oil.

Both economy and convenience dictated the preparation of plans to change from coal to oil. An initial saving of $160,000 has already been made by appropriating for the new plant eight large boilers, worth $20,000 each, which the United States Shipping board had on hand and for which they had no use.

Will Save Government $40,000

In the past the steam for heating these buildings, which comprise about 7,000 rooms, has been provided by several separate heating plants using coal as fuel and from a public service corporation that supplies steam for this purpose. The erection of a single plant and the use of fuel oil, with its attendant economy of labor and operation, according to estimates based on the present price of fuel oil, will save the government $40,000 a year.

It is planned to have the new plant in operation by January 1, 1925. The first few weeks of operation will be in the nature of a test to see whether or not it will be as economical as is estimated.

Practical Considerations in Oil Burning

(A Series of Six Articles)

By R. C. Brierly

Article 5

WITH most burners now in general use, combustion is relatively good if intelligence and understanding are used in their operation. However, efficient conditions are very difficult to get and maintain with some designs. There are burners that under most conditions are predisposed to carbon laying, because of improper designing of the register or diffuser or both, or from being used on furnaces of insufficient volume. Combustion of the oil does not take place close to the tip in some types of burners, but begins a considerable distance from the atomizer. Such burners are frequently difficult to keep lighted. Many installations that operate poorly with certain boilers could be remedied by redesigning diffusers; some varieties of burner are particularly sensitive when employed with certain types of boilers, and continuous difficulty from "panting" may be experienced.

"How can an atomizer tip spray correctly, or even decently, when it has been reamed out with a file end?" asks Mr. Brierly. This question may explain why many seemingly perfect burners refuse to function correctly. Education and instruction of firemen in proper care and operation of burners seems even more important when we see how necessary it is that such a small item as tip cleaning be done correctly.

A large number of theories as to the cause, or combination of causes, responsible for "panting" have been advanced, but some of them need modification. "Improper continuous intermixture," probably touches the cause most aptly. Pulsation is one of those things that one sometimes seems to "know less" about after prolonged study. Perhaps the most logical explanation of one of the commonest causes of these tremors, is that there is a position of the atomizer in the register where, under different powers, a temporary vacuum is produced and the lack of air is immediately replaced by a sudden rush of it, only to be supplanted again by the rarified condition; this intermittant action taking place indefinitely. In many cases if the atomizer is pulled back in the register even a half inch, the pulsation ceases at once.

The combustion is most efficient when the flame propagation nearly or exactly balances the incoming air. When the entering air current is weaker than the flame propagation, "panting" will ensue. It is possible to so delicately adjust some burners that the change in draft caused by a man passing rapidly in front of the register will cause pulsation.

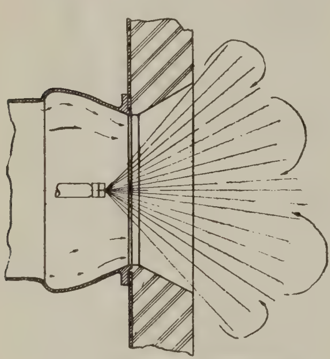

Fig. 1. Flame Propagation

Heating the oil too highly is another cause of "panting", and incorrect angularity of the furnace is still another cause that must be reckoned with.

The smaller the volume of combustion space assigned each burner, the less capacity each burner will have in pounds of oil burned under fixed draft conditions. In the early days of oil burning the amount consumed per burner per hour was relatively small, for as the amount was increased the correct intermixture of air with the oil spray was difficult to obtain. About 1909 the maximum amount of oil thought desirable to spray per burner per hour was in the vicinity of 350 pounds. At the same time fast destroyers of the Navy were utilizing about 600 pounds and more; but great economy did not accompany this.

In 1914, Mr. T. B. Stillman, Jr., was successful in efficiently spraying and burning more than 1000 pounds of oil per burner per hour. Since 1914 the size of burners has been constantly increased, enabling the number per boiler to be correspondingly reduced. Boiler fronts which in 1916 to 1917 carried as many as 16 individual burners have been replaced by those supporting 5 or even 3. A few burners that are capable of delivering 2000 pounds of oil per hour and burning it efficiently are now on the market. At the Fuel Oil Testing Plant, 4028 pounds per hour have been successfully sprayed with one burner on a modified type of White-Forester Boiler; and with three burners of the same type on the boiler, 2287 pounds per burner per hour were atomized with good results.

With installations employing large capacity burners few in number, it is true that from one point of view the capability of meeting constantly fluctuating loads is somewhat diminished; but the present designs of quickly detachable couplings, which permit the rapid substitution of atomizers fitted with tips of larger or smaller orifices, have practically elimin-

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ated, with one or two notable exceptions, demand for burners with atomizers adjustable while in position.

The most important criterions of boiler furnace combustion are:

(1) The smoke. It should be a light-brown haze. Experienced engineers can determine, with great exactness, the furnace conditions from the colour and state of aggregation of the smoke.

Flame Color Is Important

(2) The colour of the flame. If white it indicates high excess air; if yellow it means too much air is still being admitted; if red with wisps of smoke appearing near the forward end of the furnace, it shows insufficient air is being supplied. The correct flame colour is from a dull to a bright orange. Should one burner be smoking while the others are emitting a clear flame, the atomizer causing the trouble will generally show smoke in the forward portion of the furnace, and from this indication a dirty burner can be detected.

(3) The CO_2. Gas analysis is the best way of ascertaining the true condition of combustion in the furnace. Simple though the Orsat gas analysis machine is, considerable practice is required to obtain reliable determinations quickly. Care must be used, moreover, in making up the solutions and keeping them in condition. The maximum percentage of CO_2 obtainable is absolutely dependent upon the percentage of carbon, and indirectly upon the percentages of hydrogen, sulphur, nitrogen, and oxygen occurring in the oil. With most of the fuel oils now burned approximately 15.5 per cent of CO_2 may be considered perfect. Orsat analysis would then read:

15.5 per cent CO_2.
15.5 per cent CO_2+O_2.
15.5 per cent CO_2+O_2+CO.

This condition is practically unattainable; and, were it easily obtainable, there are certain factors which make it undesirable to obtain even approximately absolutely perfect combustion. 14 per cent of CO_2 with no CO may be considered very excellent indeed. Test conditions are often extremely difficult to duplicate in practice, for obvious reasons even 12 per cent CO_2 may be considered good.

The importance of fine and uniform atomization has been skillfully dealt with in former issues of **Fuel Oil**, and the effects of improper spraying have been considered, but the subject of streaked and dirty tips requires particular discussion.

Tips and Plugs Case-hardened

In order that the tips and plugs of atomizers be as resistant as possible to abrasion, they are case-hardened. The orifices in tips and the channels in plugs become eroded after long service because of the friction of the oil driven at high pressure through them. When this worn condition occurs, friction of the oil against these surfaces is increased and the spray will be affected adversely. Marring of the orifice in the tip

(Continued on Page 56).

Fire Marshal Sees Progress in Oil Burning

By Keith J. Fanshier

Time was when fire officials, state and city, regarded the oil burner as a great instrument of evil, embodying a fire hazard never before equaled. They went to great length to enforce the strictest possible rules when installations were being made. Manufacturers, of both industrial and domestic burners, were alternately indignant at their seeming persecution and in despair at ever pleasing them. But these same marshals have evidently become almost satisfied with the modern "safety first" burner their rules helped produce, for Mr. Gamber says, "Prejudice has been gradually overcome and fire officials throughout the United States realize that the oil burner is here to stay."

CRITICISM of the fire insurance interests for their alleged failure to appreciate the progress being made in development of the oil burner industry was voiced recently by John G. Gamber, state fire marshal of Illinois, in an interview with a **Fuel Oil** staff correspondent.

"A bill is pending in Congress," says Marshal Gamber, "which, unless the Underwriters' Laboratories and the fire insurance companies sit up and take notice, will take away from them the right of approval for burner standards. The bill would vest this right in the Department of Commerce at Washington." On the other hand, fire marshals generally throughout the United States are devoting much time to discussion and study of oil burning devices, and, according to Mr. Gamber, especially to burners for domestic purposes, "The junk dealer who is in the market today selling stock instead of burners is going to find himself looking for another job," is the energetic prediction of Mr. Gamber. "The insurance companies, when they insure your property, ask you at least four very leading questions, sometimes five — it all depends upon how your name sounds. "Among them are: 'What kind of construction is your home, brick or wood?' 'What kind of roof,' etc. They never get so far as to ask: 'Have you an approved heating apparatus in your home?' They say that is going too far, and that they cannot afford to make that investigation.

"We are not asking them to send out inspectors. All we want, and we are going to insist upon it, is that they ascertain from every man asking for insurance for his home whether the heating device he has is of the approved type. Then, if a fire is caused by that heating device and investigation shows he lied about his device being approved, we will insist that he get no insurance.

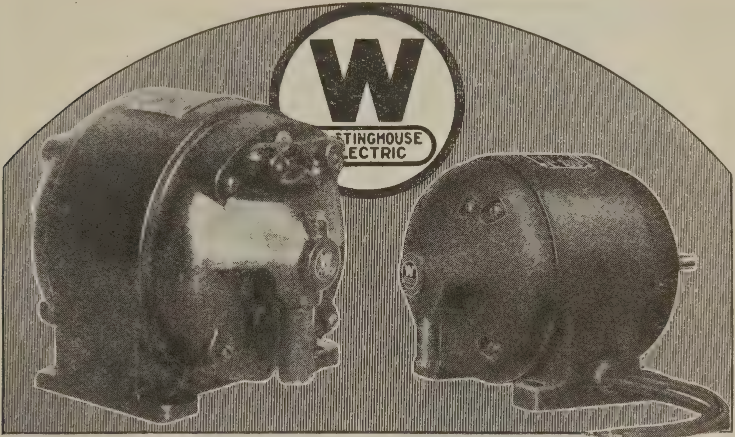
Should Back Up Laboratory Test

"If any oil burner manufacturer submits the tests of his own private laboratory, operated for his profit and his alone, there is no reason that the fire insurance interests should not back up the approval of his laboratory and give a reduced rate of insurance in homes using the types approved by his laboratory."

In reference to the bill pending before Congress, Mr. Gamber says it was introduced some time ago, but was defeated at the time because of interest taken by some fire officials who believed the time was not then ripe. "Since that time," declares Mr. Gamber, "we have had our eyes opened. We are finding out that the fire insurance companies are not backing up the approval of their own institution, the Underwriters' Laboratories, but that the latter has become more of a money making scheme rather than a protection of life and property."

Oil Heat Removes Spark Hazard

Each year, in Illinois alone, the fire loss from defective furnaces, furnace pipes and heating apparatus amounts to three or four million dollars. Sparks on roofs cause a loss of one and a half to



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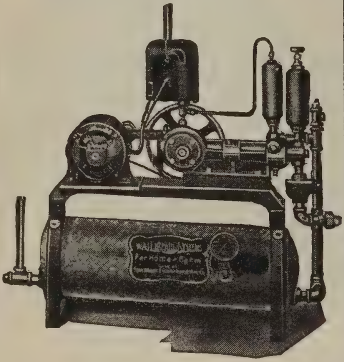

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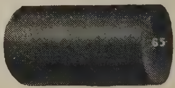
two million dollars every year. With oil heating, the hazard from sparks is entirely removed, the marshal says.

"Where poor oil burners are used we find that the hazard is just as bad as it is with coal. Therefore we are insisting that oil burners use the lighter grade of oil and have complete combustion. With the oil burning devices we don't have the difficulty of the bad smokestacks or the smokepipes running from the furnace. We have never, in the length of time I have studied the question, had one fire caused by deterioration in the smokepipe from the furnace to the chimney. There is not the deterioration there which is bound to come from the acids forming the soot that

(Continued on page 34.)



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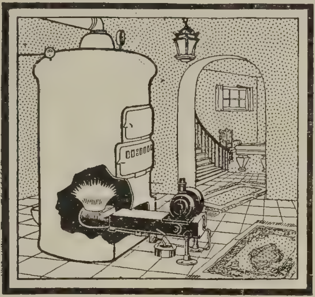

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FUEL OIL MARKETS

All Burning Oil Prices Steady—Demand Fair

CUTS in the price of crude oil had a weakening effect on the fuel oil market toward the last of the month, with the result that prospects for a strong fuel oil market throughout the summer were dimmed. However, because of the large number of refiners under contract, it is considered unlikely that a very large amount of fuel oil will be available at much lower prices. Generally speaking, it is considered likely that the fuel oil market will on the whole be stronger than last year.

Look For Weak Market

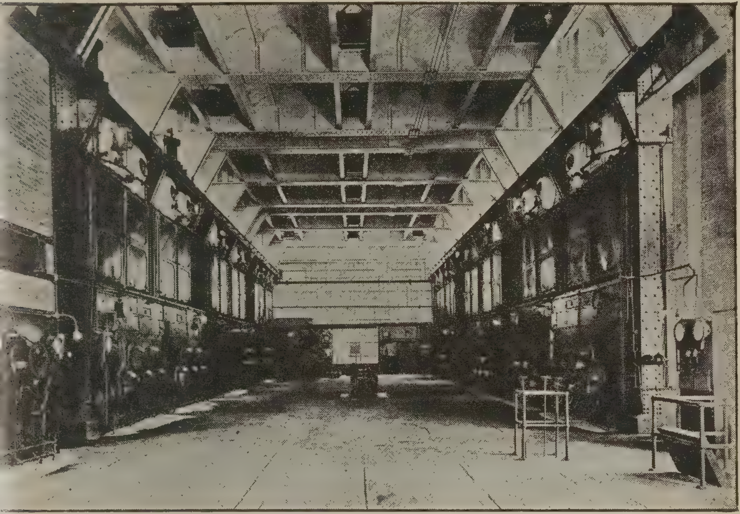
The range of prices in the entire field of burning oils has been restricted much more than usual this summer. A fair demand has been present in most of the grades of kerosene and distillates. The best informed market prognosticators are basing predictions for a somewhat weaker market for fuels before late fall on the expectations of further reductions in the crude prices. However, a contrary factor is the considerably increased demand for fuel oil over that of previous years. The large production of crude oil cannot be considered so bullish a factor in the fuel oil markets as in the market of gasoline, generally speaking, because of the fact that larger percentages of the crude barrel are going into gasoline output.

Contracts Cause Uncertainty

The straw distillate and gas oil markets are in an unsettled state because of the divergent ideas of refiners and jobbers for fall and winter contract requirements. Apparently jobbers of the lighter oils for burners are consistently uncertain as to their requirements. Refiners see little reason to reduce prices on contracts extending over the winter. This results in very little contract business on these lighter grades.

Fuel oil prices saw a higher mark about the middle of the month but there was little sustaining force after the crude prices cuts were announced. Later in the month the prices were off.

The market for kerosene is inactive, with little variation in price, and little indication for severe rearrangement within the month of August, unless the crude price readjustment should become drastic enough to affect adversely the entire refined oil price struc-



One Man Controls 55 Burners

at this large New England Sugar Refinery, which
operates under a widely fluctuating load.

This centralized control is possible only with—

Peabody-Fisher
Oil Burning Equipment

Extreme flexibility is accomplished by returning more or less oil from the burner tips. One valve controls the oil flow through all burners of a large battery of boilers.

Get all the facts—interestingly told in our Bulletin. Send for a copy now.

Peabody Engineering Corporation,

114 East 42nd St., New York City
141 Milk Street, Boston, Mass.

Memo. to Stenographer

Write the Peabody Engineering Corp., 141 E. 42nd St., New York for a copy of Peabody Fisher Bulletin.

ture.

Smackover and East field crude dropped off more than other heavy fuels, following a very light demand for these grades.

In general, buying of all power oils continues on a more or less hand-to-mouth basis, and the reduction in crude prices will not have a tendency to alleviate this condition.

Current Tank Car Prices

The following prices are for carload lots in sellers' cars f. o. b. Group 3 or adjusted to that delivery.

Fuel oil, 24-26 gravity, low sulphur, bbl.	$.77½-82½
Fuel oil, 26-28 gravity, low sulphur, bbl.	.82½-87½
Fuel oil, Smackover, bbl.	.85
Gas oil, 32-36 gravity, gal.	.02⅝-.02¾
Distillate, 36-38 gravity, gal.	.02⅞-.03
Distillate, 38-40 gravity, gal.	.03⅛-.03¼
Distillate, 40-42 gravity gal.	.03½-.03¾
Kerosene 41-43 gravity, gal.	.04 -.04¾
Kerosene, 42-44 gravity, gal.	.04⅜-.04½

Pacific steel heating boilers for oil firing are reviewed and cataloged in Bulletin 24 from the General Boilers Company, Waukegan, Ill. The Pacific, a return tubular type, is made in a number of sizes and is arranged to function especially well with any burner that has a long flame travel.

GOULDS

Hand Rotary Pump for Fuel Oil Systems

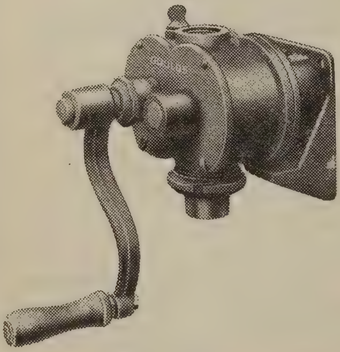


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings for handling distillate.

Furnished with bracket for attaching pump to side wall. This is a big improvement over the type that depends on pipes for support.

Capacity—10 gallons per minute.

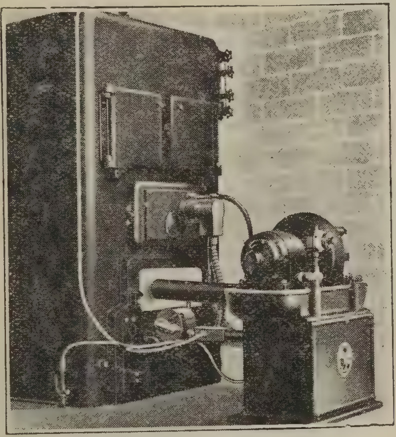
Note: We also have a motor driven pump for the same service. Capacity, 3 G. P. M.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. Seneca Falls N. Y.

Sundstrand

Silent Oil Burner



Designed and constructed by a company which has already established a splendid reputation with its Adding Machines and Machine Tools.

Fundamentals	Results
Motor Driven	Quiet Operation
Air-Oil Atomization	Complete Combustion
Pump Oil Feed	Efficient Heat Utilization
Spark-Gas Ignition	Dependable
Completely Automatic	Durable

Dealers will find this a splendid burner to market, for its perfected features satisfy the most exacting home owners and its durability minimizes the service problem.

Write today for detail information.

Sundstrand Engineering Co.
Rockford, Illinois

New Burner Firm In Chicago

Atomization and gasification of oil without the use of machinery is claimed as one of the unusual features embodied in a burner which is being manufactured by the Automatic Gas and Oil Burner Company which was recently organized in Chicago and chartered by the state of Illinois. The new concern is capitalized at $50,000.

Fuel Oil Stocks Rise In May

Total stocks of gas and fuel oil on hand May 31 at refineries in the United States amounted to 1,530,112,132 gallons, 22.7 per cent more than the total on hand at the same time last year. Total production of these oils during May was 1,155,935,780 gallons, an increase during the month of 39,172,117 gallons and of 8 per cent over the same period last year. Exports increased during the month by 13,508,496 gallons and imports increased by 20,803,847 gallons.

Federal Gauge Wins Suit

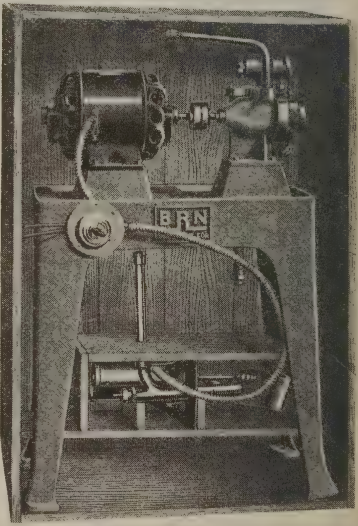
Litigation over infringements brought by the Federal Gauge Company of Chicago, against the Absolute Contactor Corp., of Beloit, Wisconsin, which has extended over several months, was ended by a decision rendered recently in the Chancery Court of Chicago in favor of the Federal Gauge Company.

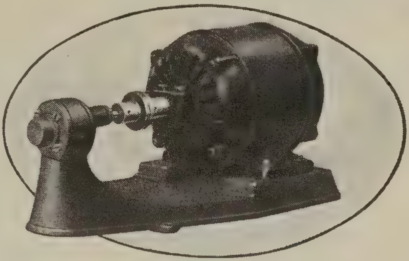
BRN
QUALITY PRODUCTS

Why Dealers Select the
B-R-N-Domestic Oil Burner

Burns any grade of oil.
New Method Electric Ignition (no gas.)
Foolproof, quiet, sootless, odorless.
Shipped, tested, assembled with ignition unit nested in base ready for quick and accurate installation. →
Minimum installation and service costs.
Entirely automatic, thermostat control.
Operates satisfactorily in any heating plant.
Sold under five year guarantee.
Attractive proposition to dealers.

Write
Blake-Raymaker-Nauman
1223 So. Michigan Ave.,
Chicago, Ill.





TRAHERN
REG. TRADE MARK
REG. U.S. PAT. OFF.

Fig. 4310

Trahern Pumps for Oil Burners

are not merely suitable, but are made expressly for use in connection with furnaces burning liquid fuel.

Some of the features which make the Trahern the practical pump for this service are:

Compact, sturdy and dependable construction.
Steady flow of liquid without pulsation.
Positive action.
Large range of capacity.
Minimum of power required to operate.
Operate against 100 lbs. pressure.

The pump illustrated above is for industrial or domestic installations. The complete line of Trahern Oil Pumps includes many other types—hand pumps for domestic use and power outfits for both domestic and industrial use.

Write us today for further information about Trahern Pumps for Oil Burners. No obligations.

LEADER-TRAHERN COMPANY
Decatur, Illinois
Plants: Decatur and Rockford, Ill.

Chicago
327 S. LaSalle St.

New York City
21 East 40th Street

KELLOGG
COMPRESSORS

Air
Compressors.
Vacuum
Pumps.
Special Oil Burning
Equipment

Our engineering and production departments are at your service in increasing your output of Oil Burners.

Send Direct
KELLOGG
MANUFACTURING
COMPANY
Rochester, New York

TANKS
Electric Welded

Fuel Oil
Gasoline Air

Welded Pipes and
Pipe Lines

Smith-Hamburg-Scott
Welding Co.
of N. Y. Inc.

Tank Plant
Marion St. and Harris Ave.
Long Island City
New York

Offices and Shops
505 West 57th St.
New York City

FIRE MARSHAL SEES PROGRESS IN OIL BURNING

(Continued from page 26.)

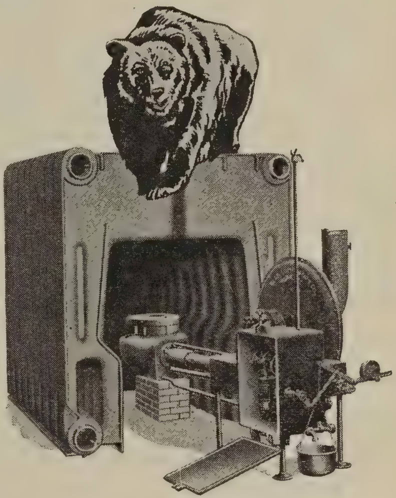
comes from coal. That is one oil burning advantage to start with. But when you do get that accumulation—and it is from the cheaper grades of oil that it comes—you have the other thing to contend with and therefore we are insisting on complete combustion.

Proper Care Eliminates Danger

"A lot of the danger of human life loss through fire is eliminated by oil burning devices, if they are properly installed and cared for. Oil burner agents and dealers must render a service to their customers to start with, because there is still that little fear in every person buying oil burning equipment as to whether it is safe. It is the dealers' duty to make the rounds and to convince his customers they are safe. He should make inspections, and not let the users start fooling with the equipment. If the householder does and an accident happens, it will set the dealer back so far it will take five years to comeback, I know. I know the feeling in a town when an accident happens. It doesn't make any difference what the equipment is. We begin to get letters from all the surrounding cities and villages, asking whether this or that equipment is safe. It is bound to retard the sale of oil burning equipment in that locality. Most of it is due, as I say, to possible lack of service on the part of the deal-

Nine Reasons

Why **Bear** Users Are **Enthusiastic**



1. They get perfect combustion.
2. They get a reduced fuel cost.
3. They are no longer dependent on the furnace man.
4. Their homes are always kept at a uniform temperature.
5. Their investment in coal, and the uncertainty of supply are eliminated.
6. Their days of running to the cellar to force, or to check the fires, are memories of the past.
7. They are no longer bothered with dust and ashes filtering through the house and covering costly furniture and draperies with destructive dirt.
8. They are rid of unsightly coal bins, and can now keep clean, tidy basements.
9. They get HEAT when wanted—100 per cent. HEAT. No waste, no bother, no dirt.

The Bear Burner is a Reliable, Durable, Automatic and Efficient Oil Burner, and can be installed in any style Coal Burning Furnace. It is Made Right and Sold Right.

Bear Combustion Co., Inc.

York, Pennsylvania

er, and on the part of the salesman, in letting the user try to get along the best he knows how.

"When gasoline stoves were introduced, I was working in a hardware store. People were afraid of them, and had a right to be, because we didn't always render the kind of service we should have rendered. We couldn't. If it happened that a little puff came on the stove, the next time father drove to town he had the stove in his wagon and wanted to trade it for something safer. It is the dealer's duty to render service until the buyers are perfectly convinced that the equipment is safe."

Marshal's Men Always Available

As far as Illinois is concerned, every agent in the state can call upon Marshal Gamber or any of his men, to make inspections of equipment being installed which is not, in the agent's opinion, safe, and the marshal's office will put a field man there, and will inspect every equipment in the city, if necessary. This is the marshal's offer.

Rules In World-Wide Demand

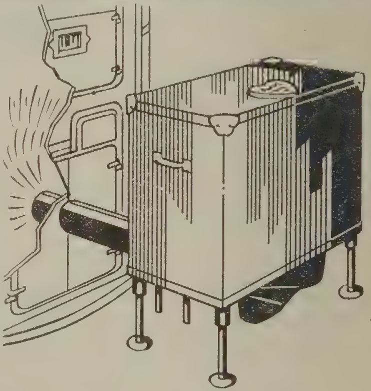
"We have laid down a set of rules, in published form, which have been called for in all parts of the world, and have gone to almost every foreign country. These rules cover both oil burning devices and the storage of oil. There are few oil burning equipments which can qualify under the rules we have laid down."

34 Years of Manufacturing Experience

Designed and built by engineers with 34 years of manufacturing experience, the Hart Oil Burner is the last word in manufacturing progress.

Automatic, easy to install and operating on an inexpensive grade of fuel oil makes the burner easy to sell.

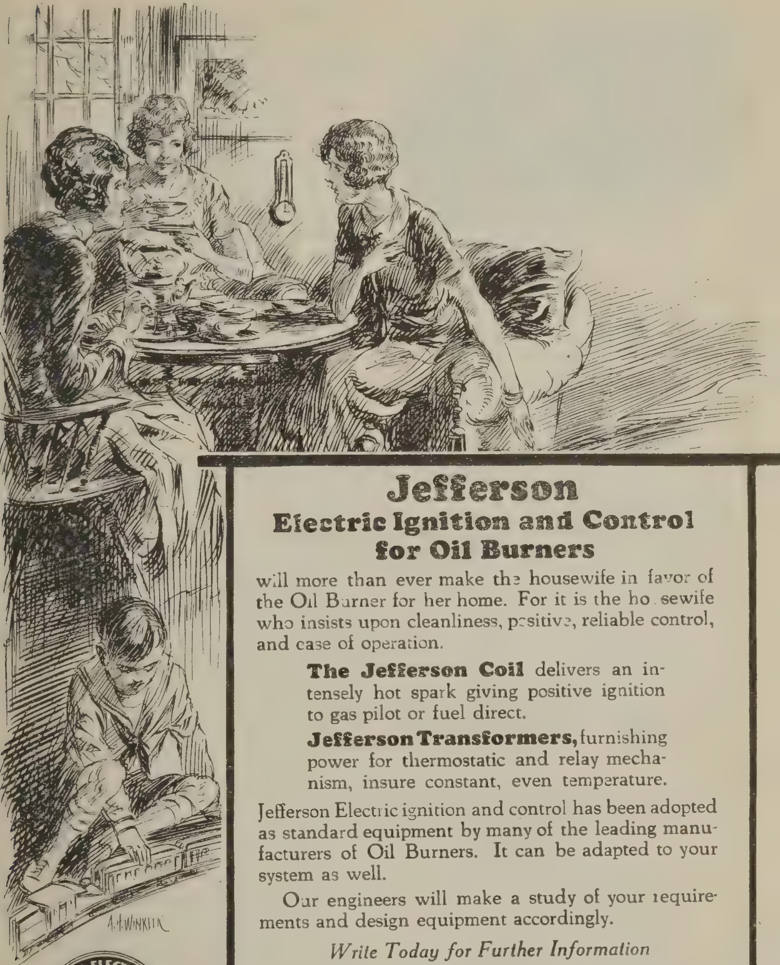
If you are anxious to handle a real Oil Burner, write at once. There is still some territory open.



Hart Oil Burner Co.

Department 101 **Peoria, Ill.**

"HART HEAT"



Jefferson

Electric Ignition and Control for Oil Burners

will more than ever make the housewife in favor of the Oil Burner for her home. For it is the housewife who insists upon cleanliness, positive, reliable control, and ease of operation.

The Jefferson Coil delivers an intensely hot spark giving positive ignition to gas pilot or fuel direct.

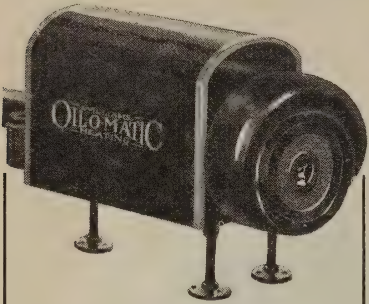
Jefferson Transformers, furnishing power for thermostatic and relay mechanism, insure constant, even temperature.

Jefferson Electric ignition and control has been adopted as standard equipment by many of the leading manufacturers of Oil Burners. It can be adapted to your system as well.

Our engineers will make a study of your requirements and design equipment accordingly.

Write Today for Further Information

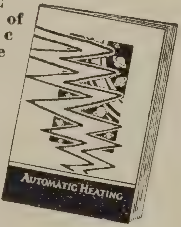
Jefferson Electric Mfg. Co.
434 South Green Street
CHICAGO



Proved for 5 Years

Some desirable territory is still open for live dealers who can qualify as OIL-O-MATIC authorized representatives. No oil burner on the market offers so rich an opportunity. Nearly 10,000 in use and every single user satisfied. Burns cheapest fuel oil. Listed as standard by Underwriters' Laboratories. Easy payment plan. Big advertising campaign bringing in hundreds of prospects every day. Free training at the Williams Institute of Heat Research. Write today for full information.

SENT FREE
Ask for a copy of "Automatic Heating" the most remarkable booklet on oil burning ever printed. Sent free on request.



C. U. Williams & Son
Main Office and Plant
BLOOMINGTON, ILL.
Branches in all leading cities.

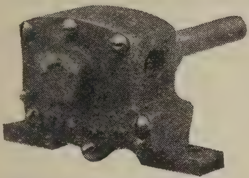
WILLIAMS
OIL-O-MATIC
HEATING

Referring again to the effort to reduce insurance rates on the best type of equipment, Marshal Gamber says he believes eventually the reduction will be made. The work of the dealer will be much easier if he can tell the prospective customer that when he installs a burner of this kind, his insurance will be reduced 10, 15 or 18 per cent. Incidentally, the marshal voiced his opposition to over-insurance on the part of insurance companies. He cited the case of an unscrupulous insurance agent who allowed a Chicago firm to buy $25,000 worth of insurance on a property which previously had been held down to $5,000. He did this after the members of the firm gave him large personal policies. A later check up showed that an insurance company "ban" had been placed on the company. The selling agent, not wanting to hurt his customer's feelings asked for the surrender of the policies and was informed they would be given up the next day. That night a fire started on the property and in the fire nine firemen lost their lives in an explosion. The coroner's jury held the two partners in the firm to the grand jury; but the agent who sold the insurance is still at large.

Made Extensive Study

"I have traveled from coast to coast to study oil burning equipment. I have gone from big city to big city to learn what they are doing in regard to regulation and installation," Mr. Gamber declared, "and I found objections in different

Teesdale Pumps for Oil Burners



Dealers and Distributors

Write for special trial offer on our Type B Pump, with motor on base. This unit is designed for dealers, and is specially adapted to gravity feed burners. It will supply either gravity or pressure burner directly from outside tank or supply a small inside tank with float switch.

Teesdale Oil Pumps Have
- Noiseless operation
- Very high suction lift
- Simple yet durable construction
- Direct operation at motor speed
- Capacity, 30 gallons an hour and up.
- Only three moving parts, oscillating type.

For Manufacturers

We build to order to meet your special requirements.

TEESDALE MANUFACTURING COMPANY

320 Douglas Street **Grand Rapids, Michigan**

THE BASEL TYPE E-3 HEAT REGULATOR

is now equipped complete, with Thermostat, magnetic control, mercoid switch for operating motor, valve, automatic cut-off, of both oil and motor from overflow of oil to trip bucket, Thermostat control and automatic cut-off each being independent of the other.

Hand control independent of either the Thermostatic control or automatic cut-off.

Removable strainer, air seal, enclosed in steel case.

In fact everything in a nut shell. What more do you want? For Mechanical or Gravity Feed burners.

Basel line of valves and heat regulators are made in seven types. Two of which are approved and listed as standard by the Underwriters Laboratories of the National Board of Fire Underwriters. All frictionless and packingless.

The Basel line of valves and heat regulators are not just ordinary valves. They mean advanced theories in Heat Regulators and Valves and Valve control construction.

Valves and valve control is our hobby. Literature on request.

911 Mulberry St. **BASEL MANUFACTURING COMPANY** **Kansas City, Mo.**

Aeroil Burner Co., Inc.
Union Hill, N. J.

Manufacturers of
Portable Oil Burners for heating
Pitch and Asphalt Kettles
Oil Burning Asphalt Kettles
Lead Melting Furnaces
Kerosene Blow Torches

Good Sideline for Oil Burner Salesmen

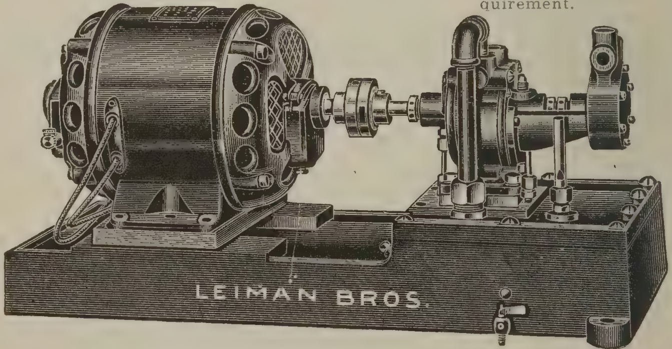
Patents, Trademarks, Copyrights, Designs. Protect your inventive ideas and valuable trademarks. Expert, prompt and personal service. For full information consult Lester L. Sargent, Patent Attorney, 524 Tenth Street, N. W., Washington, D. C.

cities to various features. I found much prejudice, due largely to hazards in connection with the old time oil burners. In the development of oil and gasoline burners, accidents occurred and lives were lost. We wanted to satisfy ourselves in this state that we were not going to approve anything that wasn't perfectly safe.

"Some states objected to the storage of oil in the cellar. Some cities objected as to quantities in storage. But prejudice was gradually overcome and fire officials throughout the United States have realized that the oil burner is here to stay.

The Reliable Oil and Air Pumping Unit for Fuel Oil Burners That Makes Oil Heating Popular

Size suitable for Homes, Apartments, Hotels, Institutions, Factories, Greenhouses, Office buildings or any other requirement.


LEIMAN BROS.

For atomizing at low pressures
7 sizes, Prompt Deliveries
NOISELESS
Self-Lubricating.
Wear Compensating.
Proper atomization—Intense Heat—Simple Construction.

LEIMAN BROS. **60 LISPENARD STREET NEW YORK** **35 Years Experience**

Oil Burner Castings

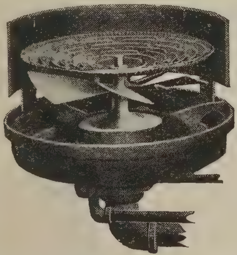
IRON AND BRASS **UNFINISHED OR MACHINED**

Various parts of oil burners require different qualities of iron for their particular use. Some require close grained leak proof or heat resisting qualities; some require soft iron for a large amount of machine work; some can be rough castings where finish is of no particular importance.

Our five foundries and machine shop insure you of our ability to take care of your requirements in every respect.

Chicago Hardware Foundry Co.

North Chicago, Illinois



Rotary Oil Burners

Entirely Consumes the Fuel

The high speed of the fan entirely breaks up the fuel throwing with it the proper mixture of air for perfect combustion. This highly saturated vapor burns all the fuel and produces an intensely high temperature blue flame. Rotary Burners operate efficiently on cheap fuel oil of 26 gravity.

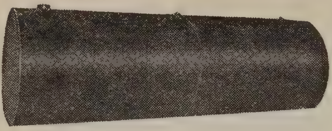
There is a size for every need—Apartments, Hotels, Office Buildings and Homes—WRITE FOR DETAILS.

ROTARY MANUFACTURING COMPANY

1526 Santa Fe Avenue **Los Angeles, Calif.**

Established 1908 **Handled by distributors**

Chicago, St. Louis, San Francisco, Oakland and others.



TANKS
For Fuel Oil

Capacities 260 to 10,000 gallons

Popular sizes carried in stock

The Boardman Co.
Oklahoma City

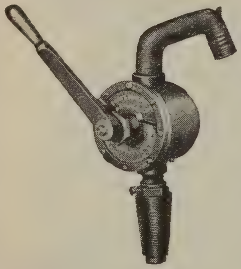
Write for Catalog and Prices

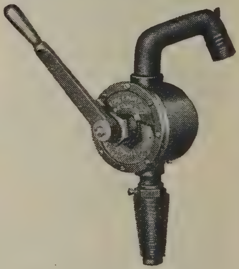
Good Treatise on Furnace Lining

Practically a complete treatise on the planning and building of furnaces, with special attention to the lining, has been issued in pamphlet form by the Jointless Fire Brick Company, Chicago, manufacturers of Plibrico furnace lining. Plibrico is a clayey, plastic material, pounded and shaped into place in furnaces with heavy wooden mallets.

The householder who has grown tired of handling the coal fired furnace is appealed to in a folder issued by Blake-Raymaker-Nauman, Chicago, manufacturers of the B-R-N burner. This burner, just recently introduced on the market, has an electric ignition system and is entirely automatic.

To Oil Burner Manufacturers and Dealers:





Why not allow us to demonstrate to you the advantage of using the FORCE PUMP in connection with burner installations.

It is a very powerful little pump, and will draw distances not usually possible with other types of pump construction.

It is hand operated, does not need priming, and is light in weight, permitting installations on a pipe line without sagging line. Write for literature, and further information.

FORCE PUMP COMPANY
1821 Berteau Ave., CHICAGO, ILLINOIS

Name.................................. Address..................................

....

Can You Manufacture an Oil Burner?

One of the oldest and best known domestic oil burners desires to change its present manufacturing connections. A poorly organized and poorly equipped plant in which the work is now being done makes economical production or delivery of sufficient quantities, impossible.

The owner would like to negotiate with a firm whose manufacturing facilities and experience are thoroughly proved.

He prefers to handle sales, but is open to contract for both the manufacture and sale, with a firm whose record demonstrates its capacity to handle a big job.

Give details of plant facilities in the first letter. References will be exchanged.

Box P. care of Fuel Oil
Bank of Galesburg Bldg.
Galesburg, Illinois

HEATING THE HOME

Converting the Residential Furnace To Oil Burning

By Byron K. Eaton *

For the sake of clearness Mr. Eaton has gone into great detail in this splendid discussion of the process of bringing the residential boiler to the correct form for the use of fuel oil. He was so explicit, in fact, that his finished article was too long to be published in one issue of the magazine. Hence, this is but the first half. The remainder will appear in the September issue.

WHILE many factors enter into the determination of fuel consumption—heating load, temperature differentials and personal temperament—boiler efficiency is a prime and vital element in the demand made by the heating plant upon the fuel. There are hundreds of different makes or styles of boilers on the market today, and scores of other types (the manufacture of which has been discontinued) are frequently encountered. Naturally these boilers, with their varying degrees of efficiency, present a problem to be studied in connection with each burner installation.

The capacity of a boiler to absorb heat from the gases of combustion is indicative of its efficiency. The accepted essentials in boiler design are grate area, fire pot capacity, direct heating surface, indirect heating surface (flues), and the uptakes that carry the gases from the combustion chamber into the flues.

Bituminous coal requires large grate areas and fire pots because of its bulkiness. It can only utilize, however, a relatively small indirect heating surface because of the additional draft requirements and the tendency toward excessive soot deposits. Anthracite coal employs smaller grates and fire pots. The indirect heating surface can be very effectively increased since the fires and gases are both cleaner and hotter. Oil fuel dispenses with the grates, re-

---

* Chief Engineer, Winslow Boiler & Engineering Company.

ANY fuel oil user that seeks to handle his lubricating oils with extreme economy should look into Bowser outfits 60 and 61.

One is a standard 25-gallon welded tank, on which is mounted a self-measuring pump; the other is a combination of two of the tanks, both mounted on one cart.

These outfits are extremely economical in price, are built to stand rough usage and immediate shipment can be made from warehouse stock.

Both outfits are of standard Bowser construction and standard Bowser material, and are guaranteed satisfactory.

For details, address Dept. 9.

BOWSER ESTABLISHED 1885

S. F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters
FORT WAYNE, INDIANA.
Sales and Service Offices and Representatives Everywhere

quires a boiler fire pot of just sufficient capacity to insure a complete combustion of the air and oil mixture and gives a very high fire temperature which demands as long a travel of the combustion gases as possible.

Uptakes Location Important

In studying any of the many types of boilers, the character and extent of the indirect heating surfaces and the location of the uptakes should be especially noted. Generally speaking, horizontal heating surfaces absorb heat much more readily than do vertical surfaces. The heat naturally arises to the under side of a horizontal surface, thence spreading in all directions beneath it. Heat tends to slide upward past a vertical surface. A lighted candle with its tip of flame placed first to one side of a sheet of paper, and then an equal distance beneath it, will clearly illustrate this point.

The uptakes leading from the fire pot into the indirect flues should be so situated as to retain the heat in the fire pot as long as possible, and to deliver the heated gases into the flues at a point as far from the exit into the smoke hood as possible. Baffling these uptakes is of value only when the gases are thereby compelled to travel a longer distance over water backed surfaces and the resultant increased back pressure does not prove too great.

There need be no fear in approaching this individual boiler

M-D-Co. Undisputed Superiority

M-D-Co. Hand Pumps for users desiring a hand operated pump.

M-D-Co. Direct Drive Rotary Pumps. Direct drive connected to shaft of electric motor and operated at standard motor speed 1725 R. P. M. in various sizes and capacities to meet practically any range of requirements.

M-D-Co. Pumps in unit with motor mounted on base for operating by hand controlled switch.

M-D-Co. Automatic Control Pump Unit automatically delivers oil from storage tank to the auxiliary tank or burner as fast as the burner uses the oil.

A pump unit for all burners we guarantee to give safe and positive service. You will find the M-D-Co. Rotary Pumps equal in efficiency and continuous duty of the modern electric motor.

Dealers and Distributors

Production is being increased to meet the demand of high powered distributors and salesmen who are alive to the possibilities M-D-Co. line offers are especially invited to communicate with us.

Mechanical Devices Company
134 Fox St., Aurora, Ill.

Oil! Oil! Oil!

Oil! Oil! Oil!

Next winter, new legions are going to heat their homes, apartments, stores and factories---*with oil!*

Those who buy carefully will buy the time-tested and proved Universal Automatic Oil Burners.

Those dealers with an eye to business will endeavor *now* to contract for their territory to sell this efficient, cleanly, dependable and economical burner.

Universal Automatic Oil Burners are entirely automatic, maintaining room temperature at any predetermined degree with a minimum of attention.

The installation of one of these burners always means the sale of several others. They are their own best advertisements. Your territory may still be open---but you better wire the factory at once.

Universal Automatic Oil Burner Corp.
238 West Larned Street
Detroit, Michigan

"Universal Heat Makes the Home Complete"

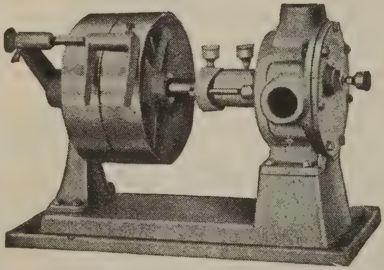
study as the principles are simple, and very few boilers are found that cannot be satisfactorily handled.

Round, cast-iron sectional boilers, are very popular for residential heating. As a rule, such boilers have several different sizes for each grate diameter, the increased capacities being secured by the addition of flat, slab-like water sections above the fire pot. The gas uptakes are staggered, so that the heated gases weave backward and forward as they pass up to the smoke hood.

Extra Series Raises Efficiency

A standard make of round boiler, typical of this class, has for each grate diameter four sizes, the assemblage being as follows: 3 series type has a fire pot and dome section; 4 series type has a fire pot, a single section and a dome section; 5 series type has a fire pot, a double section and dome section; and 6 series type has a fire pot, single section, double section and dome. The 3 and 4 series, were originally regarded as soft coal boilers, the 5 and 6 series were originally listed as hard coal boilers. Experiments are now being conducted to test heat transference in round, domestic boilers. A preliminary report forecasts that with coal as a fuel, the increased efficiency of 4 series is 14 per cent, 5 series 22 per cent, and 6 series 27 per cent over 3 series type. The increase would be even more marked with oil burning equipment.

VIKING
PUMPS



Get the Viking Catalog

Get your copy of the new, enlarged VIKING Pump catalog. Elaborately illustrated and carefully describes the efficient Viking pumping principle and its advantages. Over 50,000 of these pumps now in successful use. Will dependably handle **your** pumping needs.

Write TODAY for the catalog.

Viking Pump Company
Cedar Falls, Iowa

Branches:

B. F. Schirmer Co.	342 Madison Ave., New York City
Schirmer Co.	Finance Bldg., Cleveland, Ohio
Viking Pump Co.	549 W. Washington Blvd., Chicago, Ill.
Norton Paper Goods Co.	719 Delaware St., Kansas City, Mo.
Viking Pump Sales Co.	204 Grand Ave., Milwaukee, Wisc.
Walter O'Bannon Co.	519-21 E. First St., Tulsa, Okla.
Southern Engine & Pump Co.	Houston, Texas
Menge Pump & Mach. Co.	862 Tchoupitoulas St., New Orleans, La.
De Laval Pacific Co.	61 Beale St., San Francisco, Calif.

Get The Facts

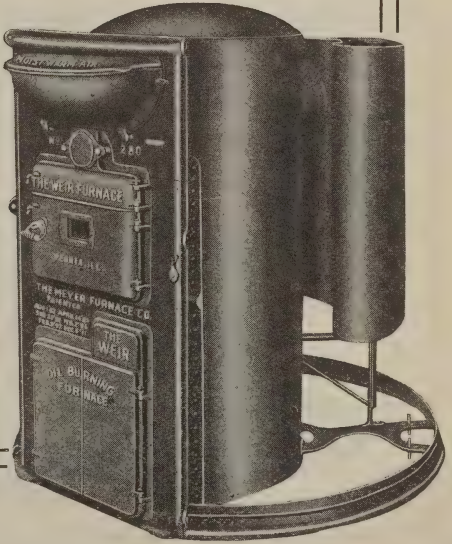
About the one proven satisfactory warm air furnace for Oil Burning——

WEIR

Write

The Meyer Furnace Company

Peoria, Illinois

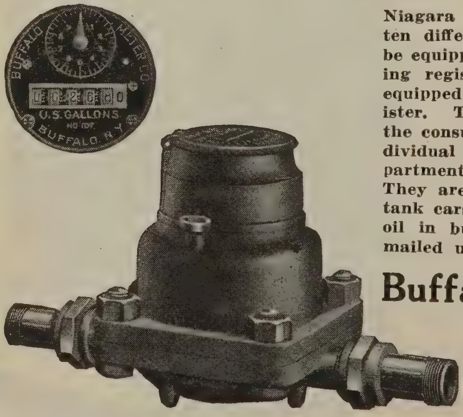


A few years ago, the writer added a second double section to a 6 series 28 inch round boiler, transforming it into what might be called an 8 series. It was used with an oil burner, and gave most excellent results.

Must Improve "Squatty" Types

While burners may be successfully installed in practically any round boiler, certain improvements should be recommended in the "squatty" types for the purpose of reducing oil consumption. The simplest, where the height of the boiler room or of the water line will permit, is to add sections up to the limit of the cataloged sizes. Sometimes this limit can be exceeded, where the clean-out doors are individual and the resultant back pressure would not be excessive. If extra sections cannot readily be added, the boiler surface can be wire-brushed and the boiler enclosed in a brick chamber with an air space of two or three inches all around the boiler. The smoke hood should be removed and replaced at a point near the base of the boiler housing, so that the heated gases must pass over all the outer surfaces of the boiler, before entering the smoke hood. This brick housing increases the indirect heating surface by the area of the outer surface, thus increasing the absorptive capacity of the boiler, decreasing the stack temperatures and increasing both the rated capacity and the efficiency of the boiler.

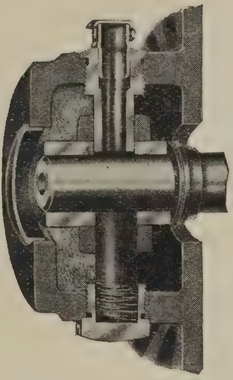
NIAGARA OIL METERS



Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.

2926 Main St.
Buffalo, New York



Standard Equipment
on Janette Motors

A Perfect Bearing

YOUR service department will tell you bearings are the cause of the most trouble in Oil Burner Motors.

Janette Wool Packed Bearing eliminates this troublesome service.

THESE dust-proof, true aligning bearings have repeatedly been tested and proven to reduce the vibration to a minimum. Retains quiet, smooth running qualities, due to the fact that the shaft runs in a filament of oil which extends the full length of the bearing.

Janette Manufacturing Company
556-558 West Monroe Street
Chicago

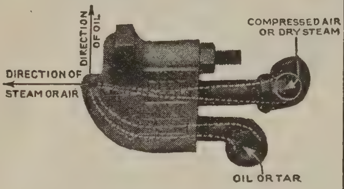
NEW YORK
SINGER BUILDING
149 BROADWAY

PHILADELPHIA
439 REAL ESTATE
TRUST BUILDING

Janette Motors

W. N. BEST

Oil Burners



The BEST since 1890

W. N. BEST Corporation

11 Broadway New York City

WE SPECIALIZE
IN
FUEL OILS
GAS OILS
FOR DOMESTIC OR
INDUSTRIAL PLANTS

DELIVERED EITHER IN
TANK TRUCKS OR
TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

OHIO REFINING COMPANY

TELEPHONE RIDGE 884
CINCINNATI, OHIO

Where a question arises as to what round boiler to specify for a new operation, it is always best to select the smaller diameter grate, with the maximum of sections above, rather than the larger grate with the fewer sections. This may be contested at first thought by those familiar only with coal fuel, who often incline to reverse this suggestion.

The base frames of round boilers are usually of thin, cast-iron extending from the floor to the bottom of the fire pot water section at the grate level. It is advisable to protect this thin shell from the intense radiant heat of the oil fire. A circular wall of fire brick just inside this base is the usual method employed.

(Continued in the September Issue.)

Royal Fire Pot Different

Very thorough descriptions of the Royal Automatic Oil Burner and instructions for its installation are included in a pamphlet that has been issued by its manufacturers, Willis W. Howe and Company, Kansas City, Mo. The Royal is a "pot type" burner, but unlike other burners of this type, it has a small steel disc placed directly over the mouth of the pot to serve as a refractory plate and to deflect the flame in a wide circle.

A line of stove and range burners have been added to the products of the Standard Oil Burner Company, St. Louis, according to a recent announcement.

Dealers!

Have You Seen the Silent Oil Burner?

THE Sword Automatic makes less than 25% as much sound as the least noisy of the older type Oil Burners. Hear and compare them.

The combustion principle employed assures silence, clean burning without carbon, of the cheapest fuel oil, retention of the maximum heat within the furnace or boiler and chimney temperatures 50% or more below any previous oil burning method.

An easy Burner to sell; mechanically perfected and simplified; installation quickly made at low expense; need for service practically eliminated. Sword dealers have a big selling advantage.

Full Information on Request

Write Now to

Sword & Kimber Company
4861 Stenton Avenue
Philadelphia, Pennsylvania

"Truflame"
Power Oil Burner
"All that the name implies"

The power burner that is at your service always. Operates as a gravity burner, should your electric power be off. Operates without gas pilot or electric ignition, and selling at a price the average home owner can afford to pay.

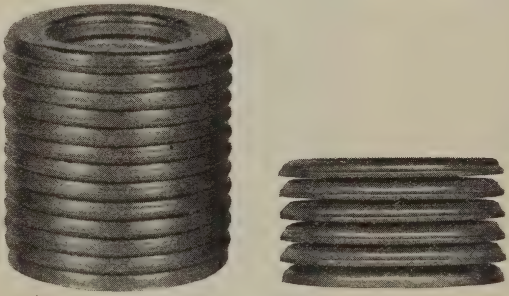
Attractive discounts to dealers.

Crescent Manufacturing Company
Lincoln, Nebr.

The Combustion Corporation Publishes Pamphlet

The Combustion Engineering Corporation, New York City, has published in pamphlet form a paper entitled, "Boiler Tests with Preheated Air," given by C. W. E. Clarke, power engineer and member of Dwight P. Robinson and Company, at the annual meeting of the American Society of Mechanical Engineers. This treatise has received much favorable comment and has been published in a number of industrial papers.

The Mechanical Devices Company of Aurora, Illinois, manufacturers of pumps for use in handling oil, has developed a pump for special use with oil burning installations.



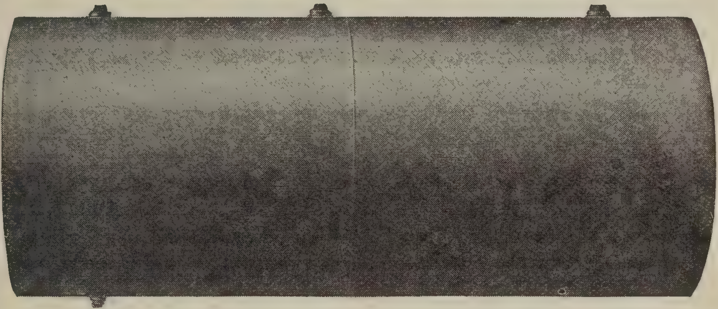
COOK

Metal Bellows

We are prepared to manufacture metal bellows for use in valves and other apparatus for oil burners, steam and hot water heating systems, refrigerating machines, etc.

Cook Electric Company
2700 Southport Ave. Chicago

TRADE
Leader
MARK



The Logical Tank
For the Dealer Who Cares

If the burner is right and the tank is right then every installation will render quiet testimony to the integrity of the dealer who installed it.

Leader builds and guarantees quality tanks for every burner need. Of the thousands of tanks shipped out for burner use not one has ever come back.

Measuring gauges, vents, fill pipes, etc., are a part of our complete line.

Your order will be shipped immediately from stock.

Send for Special Bulletin and Price List No. 11

LEADER IRON WORKS, ***Decatur, Illinois***
2118 N. JASPER ST.

PRACTICAL CONSIDERATIONS IN OIL BURNING

(Continued from Page 22).

will cause the atomized cone of oil-mist to be streaked, as the oil will follow any grooves or scratches. Efficient combustion cannot occur in these streaks of oil for the particles therein obtain no opportunity for proper diffusion.

Air Current Pierces Cone

Morever, great force is necessary to impel air into the streak. Instead of reaching the particles in the streak, the current will drive into the rarified oil-mist near it and make holes in the cone of spray. When these conditions occur, the carbon particles in the streak, having no opportunity to combine with oxygen, cause smoke. Many times this untoward state of affairs is indicated by puffs or streaks of smoke from the stack.

Dirty Tips Cause Streaks

Streaked oil spray is frequently caused by "dirty" tips—the trade term for carbon incrustation at the furnace end of the atomizer. Streaked tips should be replaced by new ones; dirty tips should have their carbon layers removed. More atomizer parts are absolutely ruined by unintelligent or careless cleaning than any other way. With care they should withstand years of service. In many oil-

Safety in Oil Burning

THE TAG Shut-off Valve, connected in the fuel lines of oil-burning boilers and other devices, automatically shuts off the oil flow the instant that the steam or air pressure used for atomizing falls below the required minimum. The TAG Valve LOCKS ITSELF and cannot be reopened until the trip lock mechanism is reset by hand, even though in the meantime the atomizing pressure has been brought up to the required point. Absolutely prevents oil leakage into furnace. Our engineering department will be glad to advise you on the application of this dependable protection to your large or small oil-firing installation.

Send for Bulletin F-468

C. J. TAGLIABUE MFG. CO.
18 TO 88 THIRTY-THIRD ST., BROOKLYN, N. Y.

Insist on Mercury Thermometers with the TAG-Hespe RED Reading Column

SINCE 1769

Announcing - -
a new service for our readers

The FUEL OIL Binder

is handsomely finished in cloth and leather, lettered in gold, and made to hold from one to twelve of the old copies of FUEL OIL that you have been saving.

Why not make your old issues of the magazine into a single volume? It will be a welcome addition to any technical library. As a reference book on oil burning its usefulness will not be equaled.

The binder is sold at cost—$1.40—for this is a *service* we offer our readers and not a profit-making enterprise.

It will be easier and safer for you to preserve your copies if you use the new binder. Send a check today and avoid delay. The present supply is limited.

Shaw Publishing Company

Home Office:
Galesburg, Ill.

Chicago Office:
20 E. Jackson Blvd.

burning firerooms both afloat and ashore the firemen have never been instructed in the correct method of removing carbon. Many of them have rounded knives, ice-picks or mineral abrasive materials for cleansing the delicate atomizer parts. No metal should touch them. How can an atomizer tip spray correctly, or even decently, when it has been reamed out with a small file-end? Only wooden implements should be used in cleaning tips and plugs. Under no consideration should abrasive be employed. Hot kerosene will usually remove any caking carbon, but, should its cutting influence be insufficient, a hardwood skewer or similar tool —of wood—should be used.

Predicts High Consumption Next Season

Approximately two hundred thousand homes, including apartment houses and other buildings used for housing, such as hospitals, burned oil for heat last winter, according to recent estimates. It is thought that the total will rise to at least 250,000 within the coming year, although this is a very conservative estimate.

Figuring 3,000 gallons as the average quantity of oil consumed in each home during the winter, next season requirements will total about 750,000,000 gallons. Probably 60 per cent of these requirements will be for a furnace oil that is a kerosene distillate over 38 degrees gravity, and 40 per cent will be for fuel oil under 38 degrees.

New Imperial Cut-Off Valve

Final development of a new Imperial oil control and safety trip valve is announced in the latest catalog issued by the Imperial Brass Manufacturing Company, Chicago. As in the other types of cut-off valves, a small cup catches the overflow from the oil burner pan or combustion chamber and a float, rising on the surface of the oil that flows into the cup, automatically trips the valve, and cuts off the oil supply to the burner. The mouth of the cup is entirely covered except for a small hole through which the oil from the overflow pipe runs. The device can be adjusted to any certain capacity.

Woods Heads Corporation

F. Pace Woods, formerly manager of the Heat Equipment Corporation, Lincoln, Neb., was made president of organization at a recent meeting of the board of directors. At the same meeting, W. H. Johnson, auditor for the Corporation, was made treasurer. H. L. Decker, E. E., has become associated with the company and will make some extensive efficiency tests of the oil heating equipment being manufactured by the company.

An association of oil burner dealers was formed recently in Seattle, Washington, and is making an attempt to get a reasonable oil burning clause inserted in the city ordinance. B. H. Dow, Nokol distributor, is temporary chairman of the organization.

CONSULTING PAGE

Q. We are planning to exploit an oil burner and we would like to be able to direct our customers to the best places to purchase fuel oil. Our burner will use a 38-40 distillate on which the local oil jobbers quote us a price of 9.7 cents per gallon on quantities of 200 gallons or less. We think this is exorbitant, inasmuch as the same oil can be obtained in Chicago for a fraction over 3 cents per gallon. What is your suggestion for getting cheaper oil? B. S. C., Milwaukee, Wis.

Ans. Reference to your July Fuel Oil will show that the price of 38-40 distilate sold in your territory in tank car lots during June was 3⅛ cents per gallon. When you add the freight charges and overhead expense incurred by the jobber in handling small quantities of distillate, you will see that his price is not exorbitant and is in keeping with the prices asked by jobbers all over the country.

However, most large users of fuel oil buy in tank car lots and get the lower prices. Distillates in like amounts can be obtained through your local jobber or from the following companies: Roxana Petroleum Corp., Arcade Bldg., St. Louis, Mo.; Spencer Petroleum Co., 1331 People Gas Bldg., Chicago; Producers and Refiners Corp., 400 N. Michigan Ave., Chicago; and the Ohio Refining Co., Cincinnati, Ohio. In preparing for such purchases remember that tank car capacities range from 8,000 to 10,000 gallons, so it will probably be necessary to install a storage tank.

Q. What percentage of fuel oil, if any, is saved by heating the oil before atomization to within 25 or 30 degrees of flash point? W. C. G., St. Louis, Mo.

Ans. For every degree above pour test that oil is heated, you add to the heat value of the oil .7 of one B. t. u. However, when you consider that the average heat value of oil is about 18,000 B. t. u. per pound, or 125,000 B. t. u. per gallon, the heat added in this way is neglible. If an oil is highly viscous, heating makes it run more freely and it is handled more easily by the burner. Perhaps this could be called an indirect saving of heat, but the heating of the oil would absorb at least as much heat as you would save in this manner, so little would be gained.

Q. Will a mixture of oil and water sprayed into the combustion chamber of an oil burner and ignited produce more heat than the oil sprayed alone? Our experiments so far give us the impression that the mixture gives the greater heat. L. A. B., Elgin, Ill.

Ans. For every one per cent of water that it contains, the heat value of an oil is reduced 13.14 B. t. u. So the mixture would produce slightly less heat than the oil and the more water you include in the spray, the less heat you will get. However, it may produce more CO2 in the flue gas and thus give the appearance of more complete combustion of the oil. If the burner is functioning efficiently though, no water is needed for this purpose.

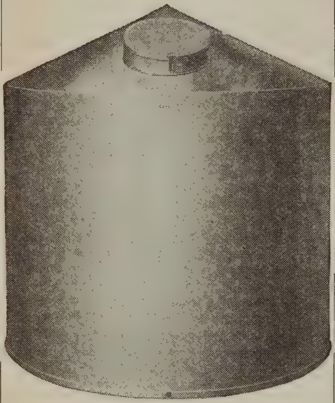
Q. On Page 30 of the June Issue of **Fuel Oil** a short article mentioned an oil burning method that saves 15 per cent over most methods employed today. Where can we obtain more information about this method? J. B. J., Chicago.

Ans. The new method was perfected by navy engineers, so you can probably get more detailed information on it if you will write to the Navy Bureau of Engineering, Washington, D. C.; Secretary of the Navy, Washington, D. C.; or the Fuel Oil Burning Department, Philadelphia Navy Yard, Philadelphia, Pa.

Q. Where can we obtain fuel oil forges for our blacksmith shop? They seem to be very scarce articles. H. E. G., Quincy, Mass.

Ans. You can obtain them from the Mahr Manufacturing Company, Minneapolis, Minn.; Kellogg Manufacturing Company, Rochester, N. Y.; and probably from the Aeroil Burner Company, Union Hill, N. J.

FUEL OIL TANKS



Vertical or Horizontal

65 to 35,000 gallons

Built by expert workmen. Tested under air pressure. Guaranteed oil tight. Immediate delivery. Write for prices and specifications.

Standard Steel Works

1606 Holmes Street,
North Kansas City, Mo.

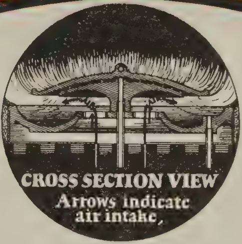
Natural Draft Burner Uses Motor

An unusual burner, known as the Rotary Oil Burner, is described in a pamphlet issued by the Allen and Lee Manufacturing Company, Wichita, Kans., its manufacturers. It is a natural draft burner which unlike others of its kind, employs a motor to assist in the process of atomization. The oil is fed by gravity, onto a blade-covered disc, situated in the center of the combustion chamber. The motor, which is located below the combustion chamber and directly connected to the disc, rotates the disc very rapidly and the oil is atomized when it is thrown from the disc by centrifugal force.

Diesels Can Be Installed Says O'Connor

Diesel engines can be installed in sixty large coal burning, steam cargo vessels of the Shipping Board aggregating 600,000 dead weight tons, now lying idle, but well preserved, if the $25,000,000 made available by Congress is spent judiciously, according to Chairman O'Connor of the Shipping Board.

An oil burner that is especially designed and constructed for installation in the American Radiator Company's Arcola hot water systems is being manufactured by the Monarch Sales and Equipment Company, St. Louis. It is known as the Speer burner and has a gravity feed system.



CROSS SECTION VIEW
Arrows indicate air intake.

Choose Your Oil Burner Now

This is the month to decide on the fuel oil burner you will handle this season. Investigate the improved SUN with its many exclusive features:

1. Can be controlled by thermostat without gas pilot light.
2. Low installation costs.
3. Low Fuel Cost.
4. Low Operating Cost
5. Minimum Servicing
6. Easy to install

Why not write one or more of the following distributors for their candid opinion of the SUN burner?

Lansing Silo Co.,	**Lansing, Mich.**	**Michigan**
W. O. Widener, 2720 McGee St.	**Kansas City, Mo.**	**Missouri**
J. H. Symonds,	**Westfield, Mass.**	**New England**
H. L. Gant,	**Denver, Colo.**	**Colorado**
Ky. Consumers Oil Co.,	**Louisville, Ky.**	**Kentucky**
Skinner Mach. Co.	**Dunedin, Fla.**	**Florida**
Keeton Oil Co.,	**Stockton, Kansas**	**Western Kansas**

Have us explain why the SUN is the easiest burner to sell. Catalog and full details upon request.

The Heat Equipment Corporation

134 So. 13th St., Lincoln, Nebr.

Heat Equipment Corp.
134 So. 13th St.
Lincoln, Nebr.

Please tell me why **Sun** Burner is easiest to sell.

Name......................

Address......................

The Sun
AUTOMATIC
OIL HEATER

MEASUREMENT OF MATERIAL IN HEATING PLANT OPERATION

(Continued from page 15.)

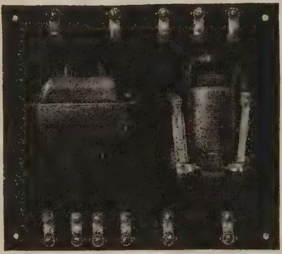
record of the temperature and the CO_2 contents of the flue gases, and the rate of flow of steam generation, will give the information necessary for intelligent boiler operation.

Draft gages are being used extensively to indicate the varying conditions inside of the boiler setting. Skeptics say that draft gages will indicate air conditions only slightly better than any one can guess at them. This is probably due to the limitations of the glass tube indicating gages. Those gages as a rule require entirely too much attention and care to keep them in good trim around the boiler. The indications are always uncertain on account of the zero level, and besides, it is very hard to read them at a distance, and no operator has the time to strain his vision for an exact reading of an instrument. The Republic Flow Meters Company has now developed a line of gages in principle and appearance similar to the dial of the commercial flow meter, both indicating and recording.

Pacific Installs Burners

Oil burners were recently installed in all locomotives throughout Louisiana and Arkansas divisions of the Missouri Pacific Railroad. Plans are being made for similar installations on other divisions of the railroad.

Thermostat Troubles Eliminated



"Signal" Thermostatic Control Relays eliminate the "weak-link" in oil burner control by absolutely preventing arcing or burning at the thermostat contacts.

All panels have approved wiring, and clearly marked terminals, are rigidly tested and ready for external connections. They are supplied with or without housing, complete with wiring diagram.

Let us know your control problems. We will gladly submit a panel to meet your needs so that you can convince yourself of its dependability, efficiency and low cost.

Provision can be made for pressure-stat, pilot light or other control that may be used to supplement thermostat.

Write for Bulletin A-40

SIGNAL
ENGINEERING & MFG. CO.
533 CANAL ST. NEW YORK, N.Y.

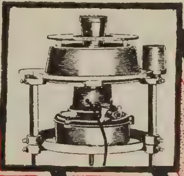
Use an ABC

Only Live Dealers Wanted

Drones and promisers would not be at home in our dealer sales organization. But there is a type of sales executive who will find in an A B C exclusive agency what he has been looking for. Is it you? Have you the ability to uphold our slogan, "The fastest selling oil burner?" Then why not let us send you the profit-indicating facts?

ABC OIL BURNER
no noise – no carbon

Automatic Burner Corp.
312 No. May Street
Chicago



Honeywell Improves Vaporstat

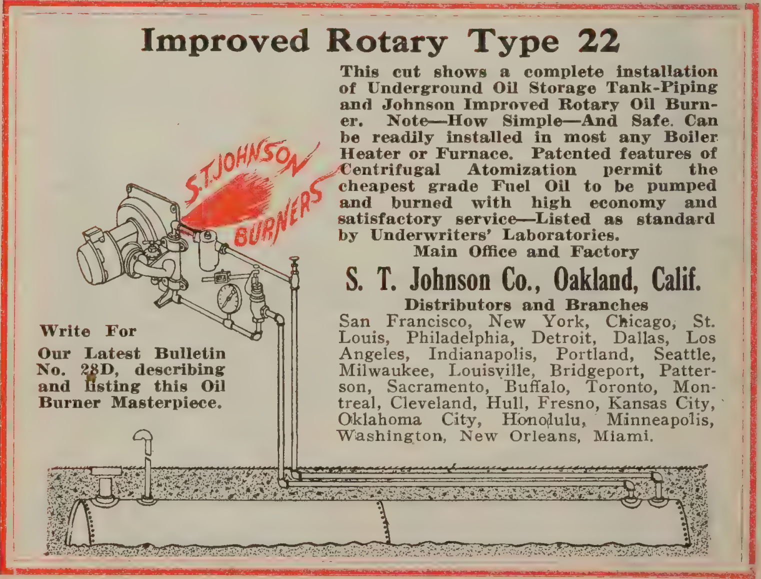
An improved Type B Vaporstat, which is being distributed by the Honeywell Heating Specialties Company, Wabash, Indiana, is described in a folder recently issued by that company. It operates on low voltage from Honeywell motors and is used for dual or primary control on any type of furnace using Honeywell controls.

Drawings Give Clearness In Folder

Every detail of a model Nufuel oil burner installation is illustrated in a pamphlet recently issued by the Nufuel Burner Company, Erie, Pa. A large drawing, showing tank, burner and furnace, giving all measurements and pipe sizes, occupies the center spread of the folder. Sectional drawings of the burner, which is a gravity feed, natural draft type, are also shown.

Folder Champions Fuel Oil Cause

A booklet which has been issued by the Bear Combustion Company, York, Pa., describing the Bear oil burner, gives a concise treatment of the oil and coal consumption question, citing costs and convenience to prove the oil burner superior to coal burners.



Improved Rotary Type 22

This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—And Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

Main Office and Factory

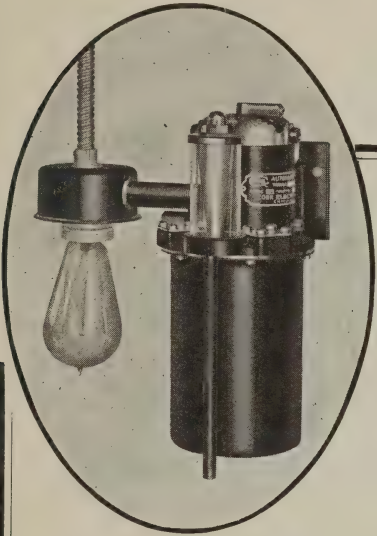
S. T. Johnson Co., Oakland, Calif.

Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Patterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.

Write For

Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.



COOK

Automatic Oil Pump

Automatically delivers oil from the outside storage tank to the burner exactly as required.

It is positive and reliable in its operation.

It is easily installed, noiseless, and operates at a cost of less than 20 cents per 1,000 gallons.

No priming is necessary.

Only 1 pint of oil is in the basement at a time.

Write for our descriptive circular.

Cook Electric Company
2700 Southport Avenue
Chicago

An Hourly Inventory on Your Oil Supply

Pneumercator Tank Gauge

Every gallon that comes in—every gallon you use—the amount on hand—all are shown instantly and accurately, at your desk if you will, by this simple, safe, non-electrical indicating device. It's a watchdog on your oil supply—preventing waste and saving time and trouble. The Underwriters have approved it—leading oil burner manufacturers endorse it.

Write for the descriptive Circular

PNEUMERCATOR CO., Inc.
40 Flatbush Avenue Extension,
Sperry Building
Brooklyn, N. Y.

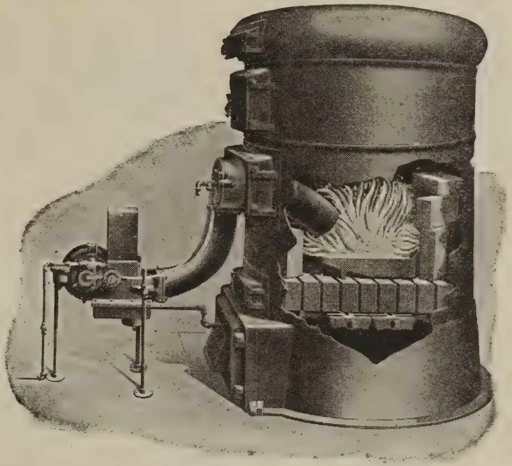
OIL BURNER AN ADVANTAGE IN LAUNDRIES

(Continued from page 11.)

desired pressure is accomplished in a shorter period of time and peak loads are met with greater ease. Equipment of ample capacity should always be installed. The original expense is a small item and the laundry owner will soon realize it to be false economy to skimp.

Baffling Is Very Important

In any industrial installation the bricking or baffling of the combustion chamber is of paramount importance. In all cases the bricking should be such as to confine the hot gases to the combustion chamber and allow natural draft to carry them off. Without such an arrangement, whether it be by bricking or otherwise, the gases take the line of least resistance and pass through the boiler without impinging on all parts of the boiler shell or tubes. For such purposes the combustion chamber should be made as large as possible, enabling the gases to linger and roll around at a slower rate of speed. To ascertain whether or not the boiler shell is being completely covered, the burner should be shut off after it has been running for some time and the brick work should be inspected. If it is all one even color, the heat distribution is alright; but if there are any sections either too dark or too light in color, those sections are receiving either insufficient or too much heat.



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Various types of combustion chambers with double bottoms for preheating the free air are quite common. Most of these have proved satisfactory and are strongly recommended. Adjustments for the free air are made with stack damper, and it is admitted below the blanket of fire and as close to the burner or nozzle as possible. Steam atomization is generally given preference

The terms "efficiency" and "economy" have appeared quite frequently in this short article, but after all they are vital questions in which the plant owner or manager is interested. The other advantages, such as cleanliness and convenience, make their appeal more strongly felt in the domestic field than in the industrial field.

Oil Company Has House Organ

"The Jewel" is the name of a monthly house organ which has been established by the Jewett and Sowers Oil Company of Chicago, oil marketers, who specialize on fuel oil marketing. It is an attractive booklet, printed on a heavy quality paper. The company recently moved its offices from 20 West Jackson to the plant at 633 West Pershing Road.

According to a recent report from A. H. D. Altree, vice-president of the American Bosch Magneto Corporation, about eighty-five oil burner manufacturing firms are making tests of Bosch equipment with their burners.

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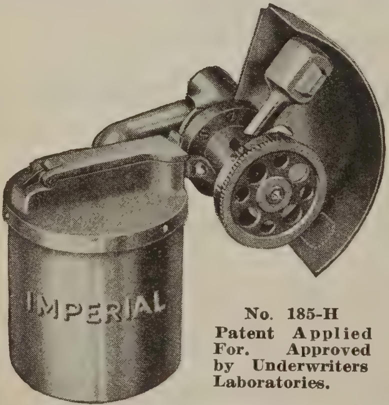

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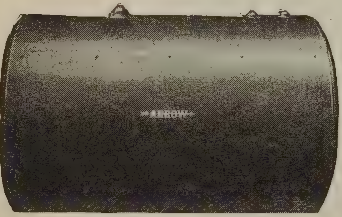

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THE WATER TUBE BOILER FIRE BOX DESIGN

(Continued from page 10.)

been more or less replaced by the inclined baffle which has a tendency to overcome many of the disadvantages of the former type. Among these disadvantages were the difference in pressure between the sides of the baffle and the difficulty of keeping the baffle tight under high temperature conditions.

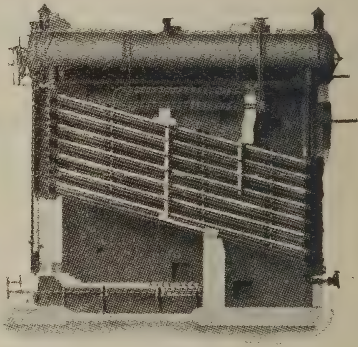

Fig. 3

Three types of baffles are in common use. One of these is the so-called flame plate baffle, which consists of flame plates extending diagonally between the tubes and held in position by top and bottom castings. The plates are coated with a hot-blast cement and then covered with interlocking tile. In some installations the cast iron baffle alone has been used without any kind of protective coating while in others just a layer of high temperature cement has been used.

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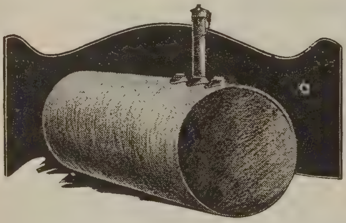

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A second type of baffle used extensively is the tile and plastic cement combination. In this construction corrugated tile is placed between the tubes, dovetailing with each other, and then all spaces between the tile and tubes are filled with a plastic cement made up of fire proof materials. In the case of a badly distorted tube it may be necessary to break out a block of the tile in removing the tube. However, under ordinary circumstances there is sufficient clearance around the tube for the withdrawal without molesting the baffle construction.

Monolithic Easy To Install

The third type of baffle construction consists of the monolithic type, made of mixtures which vary from a Portland cement to a first class high temperature plastic material. Such a baffle is easy to install. The ordinary method of building such a baffle wall is to make a form out of narrow strips running both ways between the tubes and fastened at their tops and bottom to a heavier cross member. The plastic material is then fed down from the top and tamped to place from the bottom. After the wall has been built a slow fire is started for the purpose of drying out and burning out the forms. With some classes of this material reinforcing is necessary to give the baffle the mechanical strength needed to withstand the vibration of cleaning the tubes after the boiler has been placed in service.

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Published Monthly

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Making the Domestic Oil Burner Automatic

By T. W. Owens*

SUCCESS with an automatic oil burner is dependent largely upon the efficiency of the automatic control instruments, as an automatic burner ceases to be such the moment the controls fail to function properly. The keynote of temperature regulation should be positiveness, combined with simplicity. Experience has shown that the more complicated the system and the greater the number of contacts to be made, the greater is the likelihood of troubles developing.

Tend Toward Simplification

The tendency among manufacturers today is to simplify such controls as much as possible, thus eliminating the chief cause of service calls.

In considering this important question, thought should be given to the kind of contacts used, and whether those offered are capable of resisting oxidation, corrosion and the effects of a burning arc—in other words, whether they are capable of performing positively, correctly and indefinitely.

In the average domestic installation no one member of the household, as a rule, is appointed to maintain constant vigilance over the heating plant, and for this reason it is essential that the safety controls are safe in fact as well as in name.

Underwriters Favor Automatic

The Underwriters' Laboratories, of Chicago, with the question of safety in mind, have formulated certain rules and regulations. Their recommendations are being followed to a large extent by various municipalities throughout the country. A study of these rules shows that the automatic burner is recommended over the type requiring constant manual regulation.

The room thermostat, regulating the temperature of the home, is the heart of the control system, and considerable care and thought should be given to its location, which, if improper, may result in a dissatisfied user.

---

*Sales Manager, Federal Gauge Co.

To insure proper operation, a thermostat should be so situated as to allow full circulation and should be placed where it will not be subjected to sudden drafts. Furthermore, it should be placed far enough away from radiators or warm air registers to prevent its being prematurely affected by warm air currents.

As a thermostat should always be mounted on an inside wall, care should be exercised to see that no hot water or steam pipes run up through the wall immediately back of the spot on which the control is placed.

Next in importance to the thermostat is the safety limiting device, generally referred to as the boiler control. On hot water systems the immersion type of control has been found to be the most satisfactory and reliable, as the remote stem is inserted through the top of the boiler, or in the circulating system, so as to insure complete circulation around this stem. As the temperature of the water is to be controlled, the logical place for the control is in the circulating system, where no outside variations in temperature will affect the action of the instrument.

On steam boilers the control or limiting device is mounted on the boiler in the same manner as the ordinary steam pressure gauge, and when the bourdon tube type of control is used care should be taken to have the instrument properly siphoned to prevent live steam from entering the tube and causing a set, resulting in a change in the cutting-in and cutting-out points. The siphon generally employed is the common "pig-tail" iron pipe style, which condenses sufficient steam to allow the bourdon tube to fill with water.

While the various types of steam boiler controls are quite efficient so long as the boiler has sufficient water, there is always a possibility that this feature may be neglected, and the absence of water means injury to the boiler and no steam pressure, so that under such a condition the pressure control could not function. Various methods have been adopted to guard against this condition, some manufacturers furnishing an additional control, arranged to cut out at a temperature a few degrees higher than the steam temperature at the highest point at

Obviously, unless a burner is automatic its convenience is lessened a great deal, for there is little advantage in having to watch its operation closely. Some of the more important points that make for added efficiency in the automatic installation are given here by one of the best informed men in the country. "It is a well recognized fact," he says, "that the present efficiency of automatic controls has done a great deal to bring about the steadily increasing popularity of the domestic oil burner."

(Continued on page 81)

The Home Heating Number

WHETHER they be plant owners, engineers or purchasing agents, to all who are householders September brings anew the problem of providing warmth for the coming winter. September is also the beginning of the year's busiest season for the domestic burner manufacturer and distributor.

How, then, can **Fuel Oil** be more useful to both readers and the oil burner industry than to annually devote its September issue exclusively to the problems of home heating with oil; particularly to those problems of home heating that are of fundamental concern to both the burner industry and to those plant executives who are eager to use in their homes a fuel they have found thoroughly superior in industrial work? That question asked of **Fuel Oil's** editorial staff finds its answer in **Fuel Oil's** first Home Heating number, which will be regularly issued each September in future years.

Without being immodest—for the splendid spirit of helpfulness shown by the busy men who have contributed to this number have made it possible—I count this the best rounded discussion of domestic oil burning that has so far appeared under one cover.

Leod D. Becker

Let's Have Correct Storage Tank Installations

By R. R. Schurig*

HAVING selected the oil burner best suited to our needs and, in order that we may properly enjoy the wonderful convenience of this device, let us make sure that correct provision is made for necessary oil storage; that we understand at least the fundamentals of storing and handling oil properly in our homes.

The average purchaser always asks three major questions. They are: How large a tank shall I buy? What constitutes a well constructed tank? How shall a tank be installed?

The answers should be given with due regard for three governing factors; namely, nearness to the source of oil supply, the requirements of the Underwriters, and personal convenience.

The Underwriters permit a maximum total of 275 gallons of oil storage within the basement. The only exception to this rule being in the so-called fire-proof residence. Even here, however, any storage tank in excess of 275 gallons must be bricked-in within a heavy wall and the space between the tank and the wall filled with sand. The average cost of such installations is prohibitive and the installation itself is a messy affair. The only alternative is underground storage. After all, let us concede that under the ground is the best place to store any considerable quantity of oil. The cost of underground storage is not prohibitive, is simple and much safer.

This seems a good opportunity to point out the value of the much advised custom of going to the correct source when information is wanted. When a man has had the experience with and possesses the knowledge of tanks that Mr. Schurig has, he can certainly be considered a correct source of tank information. Burner owners and prospective owners will find much pertinent advice in this article.

The average underground tank should have a capacity of at least 1,000 gallons, a smaller tank being a waste of money and costing practically as much to install. Larger residences, located at greater distances from the oil supply, should have tanks of one, two, three or even four thousand gallons capacity. When the tank is larger, the owner can save by filling it during the summer months when oil is cheaper.

Underground tanks in the capacities named should be constructed of not less than 3/16-inch plate. To use lighter material is bad practise.

(Continued on page 78)

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*Secretary, Chicago Steel Tank Co.

Supplying the Proper Domestic Fuel

By C. E. Doud*

NO one can deny that the oil burner for domestic heating has become a universal success. Tens of thousands of burners are functioning throughout the United States to the entire satisfaction of their owners. The companies being organized and equipped to furnish fuel oil for these thousands of burners are as truly public service institutions as the railroads and electric light and gas companies. To be a success the fuel oil distributors must have in their organizations men who not only know the fuel oil business, but men of considerable experience in the oil burner business itself, enabling them to co-operate with that industry intelligently.

A short but intensive course of instruction in oil specifications and tests should be taken by the purchaser of every oil burner. He should be able to tell whether the Baume gravity or the cold test of his oil is correct for the type of burner he is using. If he has such knowledge, his ultimate satisfaction does not depend upon the advice of his friends, or the salesman, none of whom knows any more about oil than he does. On this question of proper fuel turn important considerations in oil burning and it will play an important part in the rapidity of the development of the oil burner.

One of the most important services of an oil company is to be able to recommend the proper grade of fuel oil for any burner, then to have the courage to stand by its recommendations, notwithstanding cut-price competition or thoughtless statements of oil burner salesmen.

Unfortunately there are oil burner salesmen who will promise their prospects anything only to get an order. Prospects improperly or unintelligently sold seldom, if ever, are good boosters. In answer to the query from a prospect, "What kind of oil will your machine burn?" too many salesmen are apt to say carelessly, "Oh, anything! We burn the cheapest fuel oil." This may or may not be true, depending on the machine, but even if true it is not usually good business. The new owner will probably later see a price list showing prices of eight to ten different oils, varying in price from five and one-half cents a gallon to ten cents. Remembering the remarks of the burner salesman, he naturally would believe he should buy the five and one-half cent grade. A properly

(Continued on page 72)

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*Lynch-Clarisey Oil Company, Chicago.

To Have Large Oil Burning Exhibit

Large and varied exhibits of oil burners and Diesel engines will be shown with the commercial exhibits at the second annual International Petroleum Exposition and Congress which will be held in Tulsa, October 2 to 12, according to an announcement by E. F. McIntyre, general manager. Practically every type of oil burning equipment and machinery that is used in oil field or refinery work will be included.

It is likely that some of the discussion before the Congress will be upon subjects pertaining to fuel oil and its use, and the oil industry's co-operation in giving publicity to oil burning. A tremendous crowd is expected by the Exposition officials and elaborate plans are being laid for their entertainment, beauty contests, parades and pageants being among the events scheduled. Ten large buildings and about 600 feet of arcades have been built to house the exhibits, and three acres of open space will be used. It is claimed that 350 manufacturers of oil field and refinery equipment have engaged exhibit space.

This Book Tells All About Furnaces

Furnace men in all industries will find much of interest in the book recently published by W. Trinks, professor of mechanical engineering, Carnegie Institute of Technology, entitled "Industrial Furnaces." It deals with fundamental principles and facts which underlie all industrial heating operations and furnace designs, and with all applications that are independent of the nature of the fuel or energy supply.

In his discussion, Mr. Trink has given equal space to those furnaces which use fuel oil and has placed fuel oil, quite naturaly, in its proper place with regard to other fuels that can be used in industrial furnaces. The tables, charts and formulas contained in the volume insure complete understanding on the part of the reader. It is a technical book, however, for technical men, and the style is concise and to the point.

The work is an expansion and revision of about one-half of a series of thirty articles that were published by the author during the years 1919-20-21. The remainder of the articles will be published in another volume. The first book may be obtained from **Fuel Oil**.

Kleen-Heet Adds to Sales Staff

M. R. Pyne, formerly with C. U. Williams and Son, Bloomington, Ill., has been placed in charge of Kleen-Heet burner sales in Minnesota, North and South Dakota, and Wisconsin, by the Winslow Boiler and Engineering Company, manufacturers of Kleen-Heet. C. B. Finnell, formerly advertising manager of the Oliver Oil-Gas Burner Company, St. Louis, Mo., is now in charge of Kleen-Heet sales in Illinois, Indiana, Eastern Iowa and Missouri.

E. P. Bailey, treasurer of the National Airoil Burner Company of Philadelphia, recently returned to his home after an extended trip in the West.

Operating Efficiency of Domestic Oil Burners

By R. T. Haslam, N. L. Marden,
and H. E. Whitaker *

Up to the present time little has been published regarding the efficiency of domestic fuel oil burners when operated under actual service conditions.

Except for the gravity feed type, practically all domestic burners are intermittent in action, there is a period in which the fire is on full, followed by a period in which the fire is shut off. This introduces into the question of burner efficiency a factor not found in large scale industrial oil burning, namely, the heat lost up the stack during the period when the fire is off.

Three Burners Tested

We record here the results when three popular makes of oil burners were tested, not only to determine the efficiency of the burner when operating at full load but also to determine the amount of heat lost up the stack during the period when the burner is off.

Burner No. 1 is of the pressure feed type in which the oil, mixed with a small amount of air, is sprayed through an atomizing nozzle into a fire box. Just as the oil enters the fire box it is mixed with a conical blast of air from a motor-driven blower. In this type of burner all the air for combustion is supplied by the fan, the stack draft being used only to remove the products of combustion, but not to draw in air for combustion.

Burner No. 2 is a rotary type of burner in which the oil is fed to the centre of a whirling disc from which, due to centrifugal force, it is thrown out radically as very fine droplets into a rising column of air drawn in by the stack draft. The flame burns about three inches from the whirling disc, giving a well distributed flame.

Burner No. 3 is another make of burner of the same type as burner No. 2, i. e., a rotary disc type.

Made Numerous Determinations

Each burner was tested by determining the following quantities: Oil consumption per hour; flue gas temperature; flue gas analysis (CO_2, O_2, CO, N_2); and the amount and temperature of air passing up the stack when the burner was shut off. In determining the flue gas temperature the burner was allowed to run until the temperature became constant. This usually took from ten to forty minutes.

The amount of air passing up the stack during the non-fire

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*Professor of Chemical Engineering, Massachusetts Institute of Technology.

Table I

Item	Burner No. 1	Burner No. 2	Burner No. 3
Pounds of oil consumed per hour per square feet of boiler area................	0.0262	0.0075	0.0137
Cubic feet of air per minute passing up flue while burner is shut down..........	108	110	93
Per cent of sensible heat lost up stack when burner operated continuously	23.2	33.8	43.6
Flue gas temperature	695°F.	515°F.	580°F.
Flue Gas Analysis			
CO_2	8.0%	3.5%	3.2%
O_2	10.8%	15.9%	15.2%
CO	None	None	None
N_2	81.2%	80.6%	81.6%
Excess air...................................	90 %	303 %	316 %

period was obtained by bleeding into the ash pit a constant known amount of carbon dioxide and analyzing the gases going up the stack. From this data the volume of stack gases was calculated. The results of these tests are shown in Table I.

In Figure 1 is given the change in temperature of the stack gases with time when the burner is on and when it is off.

In Table II is given an approximate heat balance and efficiencies of each of the three oil-fired boilers as determined experimentally.

All three burners are of the intermittent on-and-off type and therefore the heat balances and efficiencies given in Table I hold only for continuous firing. As shown in Table I, air leaked through all three furnaces at the rate of from 93 to 110 cubic feet

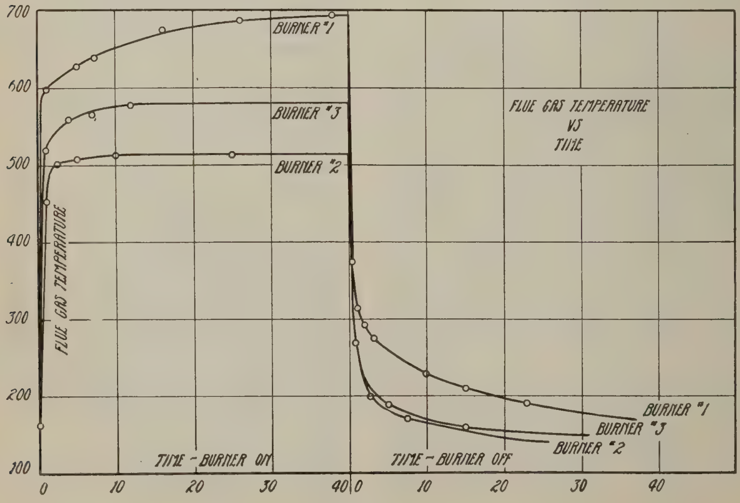

Figure 1

Table II

	Burner No. 1	Burner No. 2	Burner No. 3
Stack Losses			
(a) Sensible heat loss up the stack......	22.3%	33.8%	43.6%
(b) Latent heat of vaporization...	6.6	6.5	6.0
(c) Potential heat (unburned oil as carbon monoxide)	0.0	0.0	0.0
Radiation (assumed)..........	4.0	4.0	4.0
Unaccounted for (assumed).....	4.0	4.0	4.0
Total Losses	37.8%	48.3%	57.6%
Efficiency	62.2%	51.7%	42.4%

per minute. The leaks through No. 1 were due to faulty installation, whereas the leaks through No. 2 and No. 3 were inherent in the design of the burner, because no provision is made for shutting off the air for combustion when the burner is not in operation.

Consequently, the larger the ratio of the time the burner is off to the time the burner is on, the less is the efficiency, for the boiler heats the air which leaks through the furnace during the period of idleness. Furthermore, as shown in Figure 1, the temperature of the stack gases is highest just after the burner is shut down, so the efficiencies of these burners are evidently lower when they are burning one minute and off for one minute than when the periods are ten minutes on and ten off, even though the ratio of time off to time on is the same.

It may be noticed that the flue gas temperatures are proportional to the amount of oil burned per hour. Correcting the flue gas temperature on this basis there is given in Table III the heat balances if all these burners were operating at the same load, namely, 0.0075 pounds of oil per square foot of boiler area per hour.

We may conclude from these tests, then, that the rotary type of domestic oil burners tested require a larger percentage of excess air (approximately 300 per cent) for clean burning without a sooty flame than the pressure feed type (90 per cent). Lower excess air results in higher efficiency for the pressure feed type (69 per cent for the pressure feed type as compared with approximately 50 per cent for the rotary type.

Table III

	Burner No. 1	Burner No. 2	Burner No. 3
Stack Losses			
(a) Sensible heat lost up the stack....	16.1%	33.8%	37.4%
(b) Latent heat of vaporization........	6.6	6.5	6.6
(c) Potential heat of unburned oil (as CO)	0.0	0.0	0.0
Radiation (assumed)	4.0	4.0	4.0
Unaccounted for (assumed)..	4.0	4.0	4.0
Total Losses	30.7%	48.3%	52.0%
Efficiency	69.3%	51.7%	48.0%

Advantage of Oil Burning In Warm Air Furnace

By F. E. MEHRINGS*

WHEN the right burner is installed in the right kind of warm air furnace, the idea which exists in some sections of the United States that oil burning is not adaptable to warm air systems, is easily dispelled. In fact, it is becoming recognized that the warm air system has some distinct advantages over other systems for oil burning installations.

Thousands of leaky hot air furnaces are being used with coal fires today simply because they have been leaky so long and the leaks have grown so gradually that the owners have become inured to the gases. When an oil burner is installed, the gases being different, though much less in volume, the owner notices them at once and in most cases condemnation of the installation follows. Inspection and replacement of faulty cement or the installation of more efficient furnaces before the burner is installed will eliminate this trouble. Owners and dealers should combine in this effort.

Chief among the advantages is the fact that the warm air furnace is quickly responsive to the intermittent oil flame, which means that the heat generated by the oil burner is delivered to the living rooms immediately. This advantage of being quickly responsive may be compared to the electric light. When we turn on the switch we don't have to wait several minutes until the light comes on; neither should we have to wait for the heat to come on after starting the burner. And with the warm air system we don't have to wait, for it begins to deliver heat to the rooms above just as soon as the burner starts operating in the furnace below. With some other types of systems it is necessary to wait for several minutes — sometimes many — until the radiators begin to heat up to the point where they will efficently heat the air in the room.

Still another advantage, particularly in the milder climates, is found during the spring and fall when it is necessary to have only a low fire, or to have the burner in operation for only short periods during the day to get the required temperature in the rooms. With other heating systems it is often necessary to open windows and doors after this temperature is attained, for in most of them the burner must operate at full speed to reach the temperature wanted, resulting in still higher and undesired temperatures.

The worst charge made against

(Continued on page 54)

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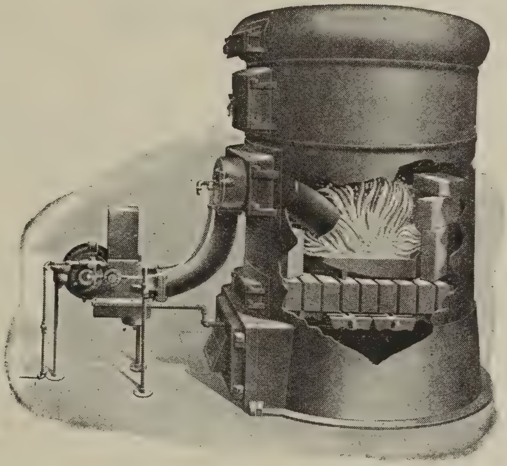
*Meyer Furnace Company, Peoria, Ill.



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Converting the Residential Furnace To Oil Burning

By Byron K. Eaton *

(*Continued from the August Issue*)

SECTIONAL boilers are made of cast iron. Each section stands vertically, sometimes on an ash pit base and sometimes on the cement floor. The sections are usually assembled one behind another so that the number determines the length but not the height of the boiler. Sections can be added without regard for the water line or head room. Each section, extending as it does from top to bottom of the boiler, constitutes a part of the fire pot as well as of the upper flues. The shaping of cast iron is easily controlled by patterns and molds so that there is a great variety of shape and flue design in this type of boiler. Each manufacturer carries out his own ideas of the proper location of uptakes and the subsequent travel of the gases past water backed surfaces to the smoke-hood.

As promised in the August issue, we present herewith the final half of Mr. Eaton's discussion of the process of converting the residential boiler to the correct form for the use of fuel oil. If we had entertained any doubt as to the author's ability to prepare an article of this kind it would have been dispelled by the many expressions of approval received from readers of the first half. Mr. Eaton has more than upheld his reputation as an authority on the subject.

Some boilers have a series of uptakes in the center of the firepot crown sheet, the gases then flowing forward where they divide into two streams flowing back to the smoke-hood along the sides. Others employ a single uptake at each of the rear corners of the fire pot, the gases then traveling forward along the sides combining into one stream and flowing to the smoke-hood at the rear through a central flue. Others use a wide uptake extending from side to side of the fire pot, at the rear, the gases then passing forward through a lower flue to a similar uptake at the front into a higher flue and then back to the smoke-hood. The sectional classification of a standard make of these boilers is as follows: Open sections have uptake openings into the flues; Closed sections have no such openings; Center sections have no tappings for heating mains; Connecting sections have tappings for heating mains.

A careful survey should be made of each boiler to determine the loca-

(Continued on page 30)

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*Chief Engineer, Winslow Boiler and Engineering Company.

FUEL OIL MARKETS

Conditions Point to a Raise in Burning Oil Prices

DURING the next few months it is likely that the market prices for burning oils will stiffen considerably. The decline in crude oil prices and the accompanying slump in the market levels of other products have failed to bring a corresponding drop in burning oil prices, which, however, are off from 20 to 30 per cent from the high point of the year. This low level may be ascribed to the normal slackening of the demand in the summer, rather than the decline in sympathy with other oils. An indication of this is the fact that quotations for fuel oils and distillates have been at roughly the same levels during the last two months, whereas the most of the crude cuts occured only about a month ago.

Stronger Than Six Months Ago

Compared with a month or six weeks ago, the fuel oil market shows strength, the kerosene market also is strong, while the distillate market is dull but is not showing evidence of underlying weakness. With winter approaching, more oil burners in use than ever before and with stocks of refined products generally being drawn upon, the evidence is for a gradually stiffer market, growing into a noticeably stronger one.

Buyers and sellers are still finding difficulty in accepting each other's viewpoints on contracts, but they are showing a disposition to talk business on a more definite basis than two months ago. It is approaching a time when it will be necessary to make definite arrangements for sale of a large quantity of burning oils against a winter demand. Offsetting the larger number of burners is the fact of somewhat larger refinery stocks of fuel and gas oils than at this time last year. Yet the statistical position of the kerosenes and the light distillates places these grades in a somewhat stronger position.

Demand Increasing Rapidly

Reports of increased demand for fuel oil continue to pile up, in both industrial and domestic lines. At least one more important railroad is considering adding materially to its number of oil burning locomotives, while the use of oil fuel in industrial plants is of greater volume than in 1923.

One large source of supply is making definite committments and is finding a good business, in contrast with the sentiment of most supply companies to adopt an attitude against definite agreements.

Another factor pointing toward better business in fuel oils is the improved business and industrial conditions generally, which it is believed cannot help being reflected by speeding up of production and consequent increase in demand for heavy oils in plants which have been entirely or partially shut down. A quotation of seventy-five cents a barrel was a basis on which both buyer and seller could do business in the spot market as the month drew to a close.

An official of one large company is advocating that refiners adopt a policy of running most of their distillates through cracking processes in summer, which will enable them to supply summer trade and weather the winter, and then shut down the cracking operations in the winter in order to dispose of the fuel oil and light distillates for burning.

Current Tank Car Prices

The following prices are for carload lots in sellers' cars f. o. b. Group 3 or adjusted to that delivery:

Fuel oil, 24-26 gravity, low sulphur, bbl......	$.75 -.77½
Fuel oil, 26-28 gravity, low sulphur, bbl......	.77½-.80
Fuel oil, Smackover, bbl.	.75
Gas oil, 32-36 gravity, gal.	.02⅝-.02¾
Distillate, 36-38 gravity, gal.	.03 -.03¼
Distillate, 40-42 gravity, gal.	.03¼-.03½
Keosene, 41-43 gravity gal.	.04 -.04¼
Kerosene, 42-44 gravity, gal.	.04¼-.04½

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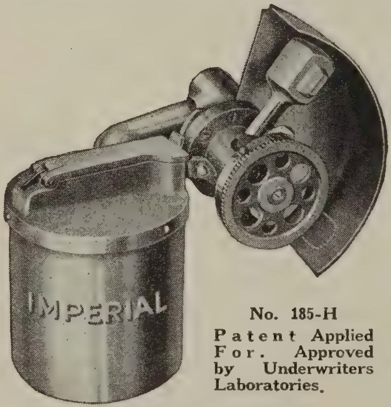

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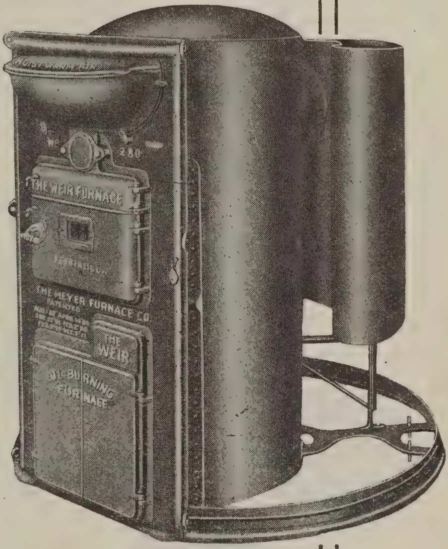

The WEIR Oil Burning Furnace

Manufactured by

The Meyer Furnace Company

Peoria, Illinois

CONVERTING THE RESIDENTIAL FURNACE TO OIL BURNING

(Continued from page 24)

tion of the uptakes and the subsequent travel of the gases. It is not advisable to depend too much on the boiler catalogs for there have been a number of cases of changed arrangement of sections. A W-22-7 of 1908 had two open and two closed sections in addition to the usual front, rear and back sections while the same boiler of 1922 has no closed sections but has four open sections in addition to the front, rear and back sections. Such changes were probably due to the shift from anthracite to bituminous coal, the latter coal requiring larger uptakes.

The doubling of these uptake areas should be controlled in accordance with the fuel used. The writer recalls a seven section boiler with four open sections in which, with hard coal, the owner reported he had never been able to get a higher water temperature than 160°. Within an hour after blocking the two front uptakes the water temperature had jumped to 200°.

Blocking Increases Gas Travel

In blocking uptakes always select those nearest to the smoke-hood (via the gas travel) as the main object of such blocking is to increase the travel of gases past water backed flues. Some sectional boilers are of the side-feeding type and in such cases the sections have a side by side assembly. Care must be exercised in this type to insure the proper location for the burner fire-pot. As

NIAGARA OIL METERS

Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.

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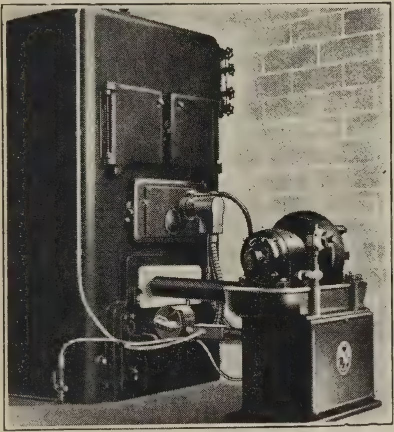
Sundstrand

Silent Oil Burner



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Fundamentals	Results
Motor Driven	Quiet Operation
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Completely Automatic	Durable

Dealers will find this a splendid burner to market, for its perfected features satisfy the most exacting home owners and its durability minimizes the service problem.

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Sundstrand Engineering Co.
Rockford, Illinois

a rule, there are vertical up-takes between each section along the longitudinal side of the boiler opposite the feed doors. Such up-takes usually enter a first, long narrow flue running from end to end of the boiler, one end being closed (except for the up-take connections into the boiler fire-pot) and the other end with an outlet into a parallel flue which also runs lengthwise of the boiler and empties into the smoke-hood at the far end. The up-takes in the end of the boiler adjacent to the outlet of the first long flue, should be baffled and the burner fire pot located centrally in that end of the boiler. This gives the combustion gases a travel within the boiler fire pot to the other end, thence, into the up-takes leading to the first flue, back to the burner end of the boiler where they pass into the second parallel flue which carries them to the other end of the boiler, discharging them into the smoke-hood.

Block Off Magazine With Brick

There are a number of magazine type sectional boilers in residential heating in the handling of which it is essential that the magazine should be blocked off from the combustion chamber of the boiler. This is most easily done by laying fire brick across the lower portion of the magazine and filling in above and around them with a mixture of asbestos and Portland cement.

Most sectional boilers have the same thin ashpit walls as found in the round type boilers, and of course, the same protection should be pro-

Oil Burner Castings

IRON AND BRASS UNFINISHED OR MACHINED

Various parts of oil burners require different qualities of iron for their particular use. Some require close grained leak proof or heat resisting qualities; some require soft iron for a large amount of machine work; some can be rough castings where finish is of no particular importance.

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A complete line of Automatic Controls.

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BELOIT, WISCONSIN

vided for the sectional bases by laying a wall of fire brick inside the shell. There are, however, a number of boilers in which the water leg extends clear to the floor. In this case it is unnecessary, of course, to install any protecting brick walls because it is essential that the radiand heat of the oil fire should be permitted to warm the water in these low water legs.

While strictly speaking, the smoke-pipe and chimney flue is not a part of the boiler, yet the fact that a preponderance of supposed boiler trouble is really chimney and smoke-pipe trouble, leads us to include a short review of this subject herein.

Oil Burning Does Produce Gas

An erroneous idea has been circulated by some people not versed in the chemical reactions of oil combustion to the effect that in efficient oil burning there are no gases and, hence, no necessity for a chimney. Needless to say, such a statement is not only ridiculous but the cause of some misunderstanding as to the importance of adequate draft in conjunction with oil burning equipment. If there is any question at all about the draft condition, the smoke-pipe between the smoke-hood of the boiler and the chimney should be removed and the thimble in the chimney examined to be sure that it is in perfectly tight, and that it projects just to the inside wall of the chimney flue and that there are no breakage in the brick or tile wall of the chimney flue around the thimble to allow a back-draft out around the flue itself. The smoke-pipe should snugly fit into this thimble just far enough so as not to reduce the cross-sec-

Quality And Dependability

That is the goal we have been striving for since the inception of our business. Not how many oil burners can we sell, but how perfect an oil burner can we produce.

Every feature of the Chalmers Oil Burners is built up from standardized units. It is extremely simple to operate, enduringly strong, and positively automatic in all its actions.

We can unhesitatingly point out our previous customers, knowing that they have only the highest praise for the Chalmers.

Correspondence with substantial parties, looking to permanent affiliations is solicited.

Chalmers Oil Burner Company

Minneapolis, Minnesota

Member American Association of Oil Burner Manufacturers.

GOULDS

Hand Rotary Pump for Fuel Oil Systems

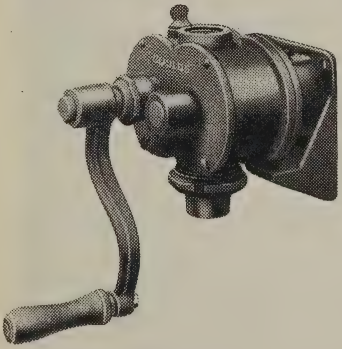

Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings for handling distillate.

Furnished with bracket for attaching pump to side wall. This is a big improvement over the type that depends on pipes for support.

Capacity—10 gallons per minute.

Note:—We also have a motor driven pump for the same service. Capacity, 3 G. P. M.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. **Seneca Falls, N. Y.**

tional area of the chimney and at the boiler end should fit snugly into the smoke-hood.

It is well to test the tightness of the brickwork of the chimney with a lighted candle and with a little cement point up any loose places in the mortar between the brick, as every small aperture reduces the chimney draft. The clean-out door in the base of the chimney flue should be tight-fitting, both as to its frame and the seating of the door in the frame. Where the boiler has a locking type damper in the smoke-hood, the damper should be examined to insure that the lever connections have been correctly assembled so that when the rod is pulled forward it will open the damper or close it, dependent upon the make, and not have a reverse action. Dampers which are not provided with a locking device should be entirely removed due to the possibility of the dampers gravitating to a closed position.

Where another heater is using the same flue this condition should be changed if possible, but were there is only one flue available, then the other smoke-pipe should enter into that single flue at a point lower than the point of entrance of the smoke-pipe from the boiler and such auxiliary smoke-pipe should have a damper which can be shut when the smaller heater is not in use.

Should Examine Chimney

While the smoke-pipe is out of the chimney, it would be well to insert a looking-glass at an angle in the base of the chimney, and thus in-

BRN
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A Few Reasons Why Dealers Select the

B-R-N Domestic Oil Burner

Because it burns a low grade fuel oil which costs the user from 25 to 30 per-cent less than the high grade oils.

Because the cost of installation is less due to the fact that it is shipped completely assembled ready for operation.

Because the cost of service is less, owing to the fact that there are but three interchangeable major parts to be serviced, any one of which can be replaced in fifteen minutes, sending the defective part to the factory for service.

Because no gas is used, for we ignite and control perfectly with electricity.

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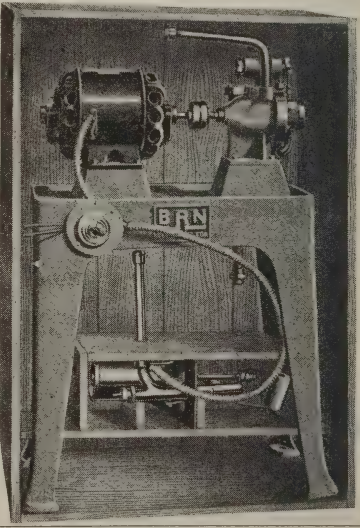

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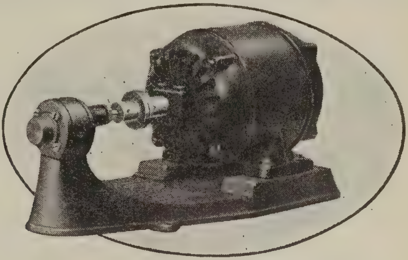

Fig. 4310

Trahern Pumps for Oil Burners

are not merely suitable, but are made expressly for use in connection with furnaces burning liquid fuel.

Some of the features which make the Trahern the practical pump for this service are:

Compact, sturdy and dependable construction.
Steady flow of liquid without pulsation.
Positive action.
Large range of capacity.
Minimum of power required to operate.
Operate against 100 lbs. pressure.

The pump illustrated above is for industrial or domestic installations. The complete line of Trahern Oil Pumps includes many other types—hand pumps for domestic use and power outfits for both domestic and industrial use.

Write us today for further information about Trahern Pumps for Oil Burners. No obligations.

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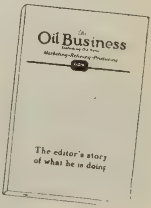
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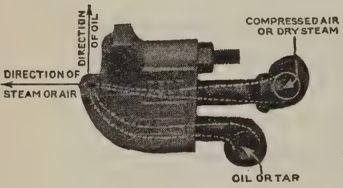

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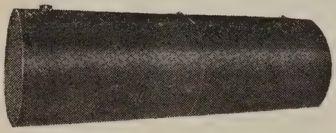

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spect its entire height for any possible foreign obstruction.

While there is plenty of room for boiler study in adapting a residential boiler for an automatic oil burner, the problem is indeed simple as compared with the practical rebuilding of the fire box of a large boiler for adaptation to the straight-shot, industrial type fuel oil burners that are becoming so popular. This industrial field is so big, covering so many types of low pressure as well as power boilers that it deserves a separate detailed study.

Minneapolis Booklet Helps Burner Men

"Making the Oil Burner Practical" is the title of a booklet that has been issued by the Minneapolis Heat Regulator Company, Minneapolis, Minn., carrying illustrations of and information on Minneapolis equipment for burners. This apparatus, for rendering the burner automatic, is made for either power or gravity types. A list of ten "things to ask about the automatic control of the burner you buy" is also included.

Peabody-Fisher Broadcasts Folder

Peabody-Fisher oil burning systems are described in a folder that has been broadcasted by the Peabody Engineering Company, New York City. Illustration of some of the larger Peabody installations, in industrial and marine boiler plants, are shown, together with some selling arguments for Peabody, grouped under the heads, "Why?" and "Because."

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The SUN Oil Burner is conspicuous because of its rapid acceptance by leading heating contractors and home owners. Truly, it is the long-anticipated. wholly-successful oil burner. It is now one of the most popular and fastest selling burners because:

Especially designed for efficiency in coal burning plants now in use.

Power or natural draft as required.

Complete combustion without noise.

Draft control insures complete burning of all gases before leaving combustion chamber thus preventing hot chimneys.

Installation and design utilize entire combustion chamber insuring high CO^2 efficiency and fuel economy.

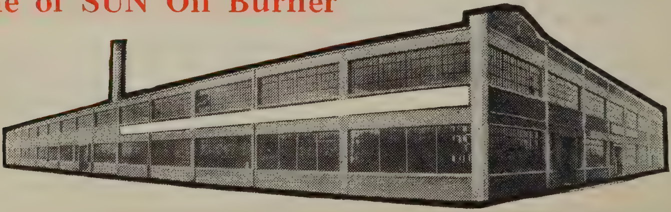
Latest safety features, special valves and automatic controls (optional) approved by National Board of Fire Underwriters.

Dependable low flame allows use of complete thermostatic control without gas pilot light.

One man can install complete with tank in 5 to 8 hours.

Sold at a reasonable price.

Home of SUN Oil Burner



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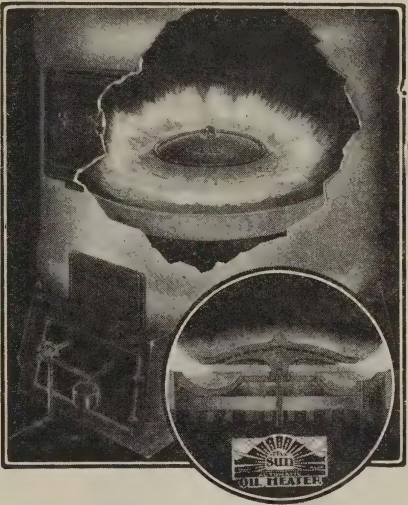

(Note how Sun Burner makes use of entire combustion chamber. Cross section view shows construction which insures proper mixture of oil-gas and pre-heated air.)

The SUN Oil Burner is the result of exhaustive tests and wide experience in the science of combustion and heating principles.

It is backed by a company having 35 years' experience in manufacturing and in the merchandising of manufactured products. This company enjoys the highest rating given by either Dun or Bradstreet.

We invite correspondence with established and reputable firms or individuals, familiar with domestic and industrial heating, who are seeking a completely dependable and efficient fuel oil burner. We have facts which will be of deep interest to you. Your request will bring full particulars.

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A most significant fact is that hordes of experienced oil burner dealers are discontinuing other makes and selling the SUN Oil Burner. Also, homes by the hundred are scrapping old-fashioned, cumbersome burners and installing the SUN. The SUN outshines them all.

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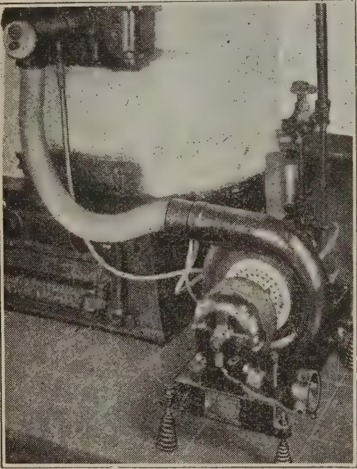
Please send full facts about your SUN Oil Burner, including dealer prices, etc.

We Want *Only* RELIABLE DEALERS

Who know Oil Burner Installation or Are Willing to Come to Our Plant to Learn.



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The Burner with the Least Possible Service Required

ALADDIN OIL BURNER CORP.
740 So. Michigan, Chicago

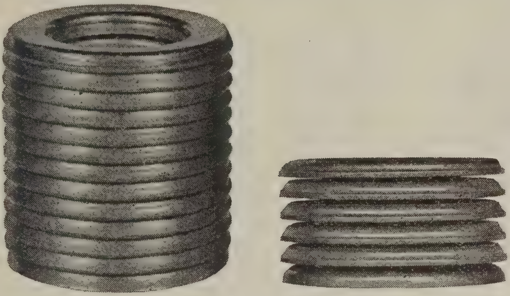
Standardization Is Gaining Headway

More wide-spread interest and activity in industial standardization is being exhibited at present than ever before, according to the new year book of the American Engineering Standards Committee, New York City. One hundred and fifty-two projects have been completed or are under way by the committee, and in these various projects there are one hundred and thirty-five national organizations, technical, industrial, governmental—officially cooperating through accredited representatives. Standardization of oil field equipment, with the aid of various oil men's associations, and of tanks, with the aid of tank and steel men's associations, are two of the projects that are now under way.

Sword Has Circular Flame

Chimney losses sustained when a Sword oil burner is used are very low, according to a pamphlet recently issued by its manufacturers, the Sword and Kimber Company, Philadelphia. A flame that curves out and down, all around the edges of the firepot, giving the appearance of a large circular tube of fire, is the new feature of the burner that is claimed to give the low chimney losses.

New speed regulators have been attached to their Buffalo Electric Blowers, according to an announcement by the Buffalo Forge ompany, Buffalo, N. Y.



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We are prepared to manufacture metal bellows for use in valves and other apparatus for oil burners, steam and hot water heating systems, refrigerating machines, etc.

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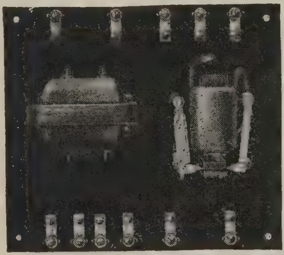

Provision can be made for pressure-stat, pilot light or other control that may be used to supplement thermostat.

"Signal" Thermostatic Control Relays eliminate the "weak-link" in oil burner control by absolutely preventing arcing or burning at the thermostat contacts.

All panels have approved wiring, and clearly marked terminals, are rigidly tested and ready for external connections. They are supplied with or without housing, complete with wiring diagram.

Let us know your control problems. We will gladly submit a panel to meet your needs so that you can convince yourself of its dependability, efficiency and low cost.

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There is some good territory in which we are not represented.

Write for our literature "What Users Say of Their Hubbard Burner"

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MINNEAPOLIS, MINN.

Hubbard Installation Plan Unusual

An unusual plan for burner installation is illustrated in the latest folder issued by the Hubbard Automatic Oil Burner Corporation, Minneapolis, Minn., manufacturers of the Hubbard Oil Burner. The equipment includes a nozzle, motor and air compressor, air tank, and oil tank. The compressor and tanks are grouped together and can be located any place in the basement with respect to the furnace position. The air is furnished from the compressor, through overhead piping to the nozzle, which enters through the furnace door, pointing downward at an angle of about 45 degrees. The oil, which is brought through a pipe on the floor, enters the nozzle and is atomized with the aid of the air current. The flame is directed downward on a honeycombed pile of firebricks, thus giving a long flame travel, according to the folder.

Starr Joins Sword and Kimber

F. C. Starr, formerly of the U. S. Navy and more recently with the Engineer Company of New York, has joined the Sword and Kimber Company, Philadelphia, as consulting engineer, according to an announcement by L. M. Nelson, sales manager. Mr. Starr is the designer of the mechanical oil atomizer that was accepted by the Navy and used in the merchant marine during the war. He was also in charge of the installation and operation of the oil burner plant in the U. S. S. Oklahoma, the first oil burning battleship in the Navy.

250 Gal. Tank Clears Basement Door

The newest and most widely approved development in the fuel oil industry is the Morrison 250-gal. supply tank that is easily installed in the basement where it belongs.

It is OVAL shaped. Passes through any ordinary door and occupies little space in the basement. Hand piston pump fills 50-gal. auxiliary tank. Fuel oil flows to burner by gravity. Complies fully with Underwriters Laboratories rulings. Most compact and efficient tank assembly built. Write for literature and price.

MORRISON BROS.
"Oil Equipment Headquarters"
DUBUQUE, IOWA

Specifications:

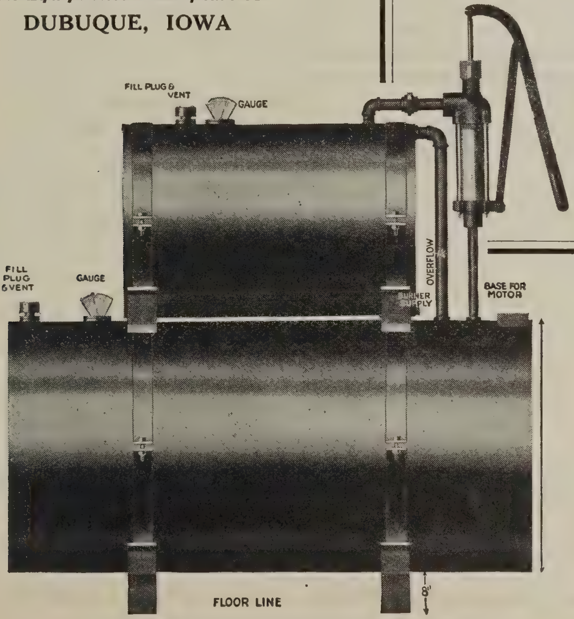
Supply tank, 250 gal.

Auxiliary tank, 50 gal.

14-gauge black galv. steel

Hand piston pump

Equipped with joining bands, connecting pipes, overflow pipe, measuring pipe and dials.



Patents, Trademarks, Copyrights, Designs. Protect your inventive ideas and valuable trademarks. Expert, prompt and personal service. For full information consult Lester L. Sargent, Patent Attorney, 524 Tenth Street, N. W., Washington, D. C.

LILLIBRIDGE
OIL VAPOR BURNER
Listed as Standard by Underwriters Laboratories
Tested by Iowa State College, Ames, Iowa, and proved highly efficient.
They last and satisfy.
Reliable dealers wanted
LILLIBRIDGE HEATING CORP.
Hutchinson, Kansas

Agents Wanted

for the only Natural Draft Fuel Oil Burner on the market. Little operating trouble, easily installed and will burn distillate, furnace, kerosene or fuel oil. Write for particulars and prices.

The Economy Oil Burner
303 Central Ave.
Leonia, N. J.

Standard of N. J. Issues Booklet

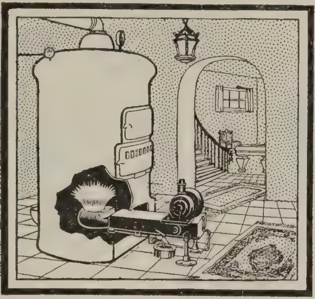
One of the best booklets yet to be issued by an oil company to further the cause of oil burning was published recently by the Standard Oil Company of New Jersey under the title "Can I Burn Oil In My Furnace?" Every angle of the "Oil vs. Coal" debate is reviewed and in each case conclusive proof in favor of oil is given. Probably the most interesting part of the booklet is a table of comparative costs of oil and coal, giving the consumption and cost of oil and its coal equivalent under varying conditions, from the most efficient burner operating under favorable conditions to the least efficient burner operating under unfavorable conditions.

Can Use Same Furnace For Coal or Oil

An oil burner known as "Summerheat" has been placed on the market by the Electromatic Appliance Corporation, Hamilton, Mo., according to a recent announcement. Officials of the company claim that their burner, a small one, can be used on any furnace and that coal or any other fuel can also be used at any time without disturbing the burner, which they state requires but little trouble and time to install.

Reports from St. Louis, Mo., are to the effect that a new gravity feed, vaporizing type of burner, known as the St. Clair, has been placed on the market by the St. Clair Oil Burner Company of that city.

Now here's a *profitable* franchise



Electric Ignition

A Success—We've Proved It

Electric ignition had to be proved. Many doubted its efficiency—its reliability. It was too good to be true.

So Kleen-Heet engineers perfected it. And now hundreds of Kleen-Heet owners have proved it. All over the country. In every type of service. The results have been better than we had even hoped for.

Now Kleen-Heet, with electric ignition, burns very low grade oils. Hence it is economical. And each dollar buys MORE HEAT UNITS than ever before.

Heating history has again been made. And as usual, by Kleen-Heet.

Kleen-Heet

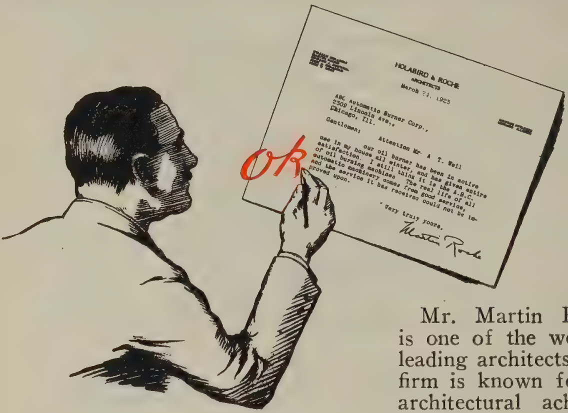
NO LABOR · NO COAL · NO ASHES

Automatic Oil Burning Systems
Division of

Winslow Boiler and Engineering Co.

General Offices: 208 South LaSalle St.
Chicago

Oil heat for the smallest bungalow to the tallest skyscraper


HOLABIRD & ROCHE
ARCHITECTS
March [illegible], 1923

ABC Automatic Burner Corp.,
2309 Lincoln Ave.,
Chicago, Ill.

Gentlemen;

Attention Mr. A. T. Weil

our oil burner has been in active use in my house all winter, and has given entire satisfaction. I still think it is the A.B.C. of oil burning machines. The real life of all automatic machinery comes from good service, and the service it has received could not be improved upon.

Very truly yours,
Martin Roche

Mr. Martin Roche is one of the world's leading architects. His firm is known for its architectural achievements.

Practical Men—
Architects and Engineers—
Endorse A B C

"Proof? Proof?" Engineers and architects listen impassively to claims; even theory that has stood the assault of laboratory tests leaves them unmoved. There is only one way to answer their illusion-shattering question—and that is with proof.

ABC easily supplied the proof of its leadership. And these cautious practical men, quick to recognize real merit, have endorsed it in the most convincing way—by specifying ABC and by putting it in their own homes.

ABC OIL

no noise~

Twelve reasons why A B C is the leading oil burner

1. Quiet ABC is really quiet. Allowances are not made after installation.

2. No Carbon or Soot Engineers know what an immense advantage this is.

3. Less Oil Required Unique means of atomization assures complete combustion. Every particle of oil is burned. The heat rises slowly and is completely absorbed by the boiler.

4. Longer Boiler Life Circular flame, evenly applied all around the boiler, greatly increases its life.

5. Burns low-priced oils ABC burns gas oil and fuel oil.

6. Odorless An ABC heated home is odorless.

7. No Unsightly Parts Outside of Boiler This ABC feature has made sales.

8. Simple Only one moving part subject to wear.

9. No Fan or Blower Heat is not blown up the chimney and wasted. No noisy fan introduces ABC to your guests.

10. Clean It's useless to say how clean ABC is. You must see to appreciate.

11. Automatic Heat when you want it—as you want it.

12 Even Heat. Twenty below or twenty above, ABC gives unvarying heat.

Executives Wanted

to open exclusive sales agencies

Men with sales or organizing ability, men with capital to invest, there is no industry with so rich a future as the selling of oil burners.

An ABC exclusive agency is worthy of your earnest consideration. Let us send you the facts.

AUTOMATIC BURNER CORPORATION
312 North May Street, Chicago

BURNER

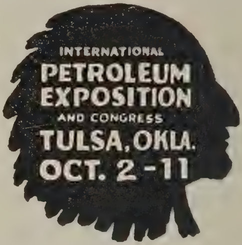
no carbon

Deals Blow At Coal Burning

Another blow in behalf of oil in the Oil vs. Coal argument was dealt recently by the Lillibridge Heating Corporation, Hutchinson, Kan., when it published a folder carrying compiled lists of the disadvantages of coal and the advantages of oil. The Lillibridge burner is a gravity type and can also be used with gas as fuel. It has been approved by the Underwriters.

Electrodes Form Ignition System

Two large electrodes, between which jumps an electric spark generated by a magneto, make up a new ignition system that is embodied in the May oil burner, manufactured by the May Oil Burner Corporation, New York City, according to literature recently distributed by the company. The operation of the burner is automatic, according to the statements, and the oil is pumped direct to the spray nozzle from the tank, the nozzle being designed to atomize the oil.

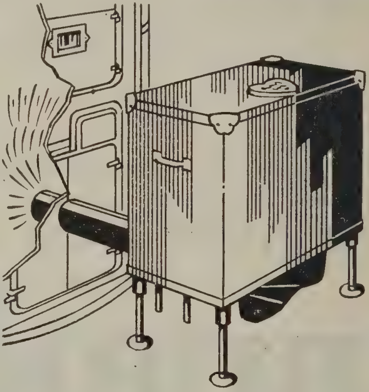


34 YEARS OF MANUFACTURING EXPERIENCE

Designed and built by engineers with 34 years of manufacturing experience, the Hart Oil Burner is the last word in manufacturing progress.

Automatic, easy to install and operates on an inexpensive grade of fuel oil.

It is safe, dependable and economical—assures an even steady warmth regardless of temperature changes. To fully appreciate this burner, send for our catalog, "Road to Happiness" and our booklet of testimonial letters.

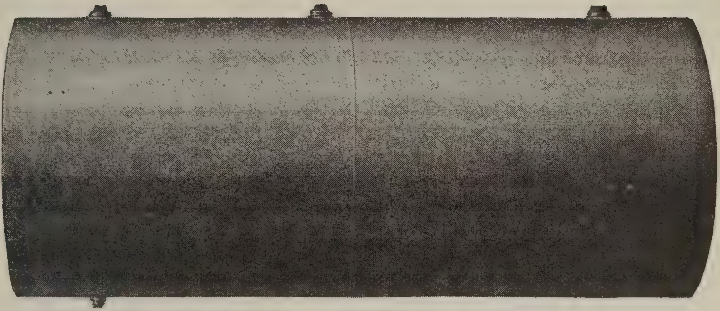


Hart Oil Burner Co.

Department 101 **Peoria, Ill.**

"HART HEAT"

TRADE Leader MARK



The Logical Tank

For the Dealer Who Cares

If the burner is right and the tank is right then every installation will render quiet testimony to the integrity of the dealer who installed it.

Leader builds and guarantees quality tanks for every burner need. Of the thousands of tanks shipped out for burner use not one has ever come back.

Measuring gauges, vents, fill pipes, etc., are a part of our complete line.

Your order will be shipped immediately from stock.

Send for Special Bulletin and Price List No. 11

LEADER IRON WORKS, *Decatur, Illinois*
2118 N. JASPER ST.

ADVANTAGE OF OIL BURNING IN WARM AIR FURNACES

(Continued from page 22)

hot air furnaces is that gases and fumes leak from the fire box into the warm air channels and are carried up into the rooms. This has been true in some cases in the past where forced draft burners have been installed in furnaces which, likely enough, were faulty and leaky. We can obviate such trouble however, by sealing the jackets of the old furnaces in which the installations are made, thus rendering them gas-tight, or, if the installation is to be made in a new furnace, by choosing one whose construction insures permanent tightness.

Frankly, the ordinary type of sectional warm air furnace is not as dependable for oil burning as the seamless steel body type. This is true for a number of reasons. One, for instance. being that with the ordinary furnace the bottom is not sealed and oil, which will leak through opening that smoke and gas will not, sometimes drips to the floor beneath the grates, runs into the air compartments, is heated, and the resulting fumes are carried into the rooms. This is not possible in the steel body type, for all joints are electric arc-welded and are absolutely leak proof. This is but one of several advantages.

Conclude Warm Air System Best

We conclude, then, that for oil burning the warm air systems have a number of advantages over other heating systems and the steel body

Improved Rotary Type 22

This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—And Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

Main Office and Factory

S. T. Johnson Co., Oakland, Calif.

Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Paterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.

Write For

Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.

34-36 Amber Gas Oil **38-40** Light Straw Distillate are without peer in their respective classes.

Refined in our three modern refineries and transported to your storage in our fleet of tank cars.

Ask our nearest sales office for quotations.

PRODUCERS AND REFINERS CORPORATION

Denver Chicago
Tulsa Omaha
Waterloo, Ia.
Memphis, Tenn.
Salt Lake City

type is the best type of the latter system to use.

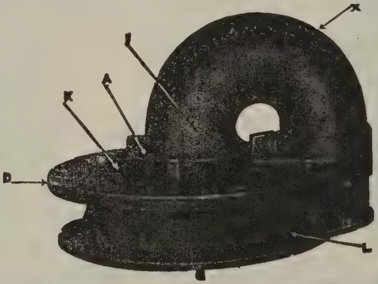
One fact to which the oil burner buying public must be educated is that the installation of an oil burner will not overcome the evils of poorly installed or unsatisfactory heating plant, and unless the oil burner dealer himself is thoroughly familiar with heating plants, it is well to consult a heating contractor before installing an oil burner.

Ace Has Several New Features

After a testing period of a year, during which the burner was tried out in about 200 homes, the Oil Burner and Refrigerating Company, of Evanston, Ill., has placed the Ace Automatic Oil Burner on the market. The burner embodies several new features, among them an oil pilot light, the same oil being used for the pilot and the high flame. This, according to officials of the company, is regarded as especially important in the gasless districts. It is also claimed to have a simple and positive combination regulating valve and safety shut-off valve.

An unusual form of atomizer consisting of a carburetor located on the outside of the furnace and employing a blast of air furnished by a blower, is employed by the Super Automatic Oil Heater, manufactured by the Super Oil Heater Company, Pawtucket R. I., and distributed by the Ballard Oil Equipment Company,

The White Flame



Liberty Oil Burner

Throws the Flame out against the side of the Fire Box

The **Liberty Burner** is **Made Right** to **Heat Right—Quiet** in operation. **No Soot** or **Carbon** to cause Servicing after installation of Burner. Thousands of Satisfied Users.

Successfully operated by Thermostatic Connections

Sold only through reliable Dealers and Distributors, at very Liberal Discounts. Write for Exclusive territory. "Years in Successful Use."

Liberty Oil Burner Co., Inc.

Leavenworth at 16th St., **Omaha, Neb.**

AUTOMATIC OIL PUMP and TANK

Complete within itself. Automatically supplies oil to burner from storage tank.

Quiet operating. Maximum operation, about four times in twenty-four hours Governed by positive acting float switch that cannot fail No movable parts exposed. No working parts cramped into small area.

Monroe Machine Tool Company.
737 W. Jackson Blvd.,
CHICAGO

Write for Bulletin "G"

MONROE OIL PUMP

Induction Coil Is Logical Ignition Device

By Charles J. Voge *

AFTER witnessing the great strides taken by the automotive industries when electric ignition was found to be a success, it is amazing that there has been so few attempts to use it in oil burners.

Wherever there is current available to operate an automatic burner, there is also current for ignition, and, unlike the gas pilot light, it is not influenced by cold weather, atmospheric pressure, or other conditions. It is my contention, however, that the ignition which eventually predominate will be that in which an induction coil, which is probably the most reliable and economical of the electrical ignition devices, is used.

> *"There is no reason why the oil burner manufacturer should not avail himself of this, the only logical ignition from every standpoint," writes Mr. Voge, "for it made the modern automobile a possibility and the electrical manufacturer can build coils for this purpose that are as reliable as any used for similar work."*

The induction coil should be of the vibrating type, for there is no need for a distribution of spark as in the case of the multi-cylinder automobile, and a mechanical interrupter is unnecessary. The vibrating coil gives a steady shower of sparks that will ignite a vapor much easier than a system generating a single spark, no matter how often repeated. The single spark is effective in the automobile engine because it ignites an explosive charge instead of a spray. Even here, however, the vibrating coil is holding its own, for many cars of well known makes are equipped with them.

For oil burners the coil must produce a hotter spark, not necessarily a longer one, than for automobiles, for the gravity of the fuel used is much lower. High frequency current such as is generated by coils of this type is known to produce the most intensive concentrated heat at the lowest possible cost. In a test I made recently in conjunction with the patentee of one of the most popular burners, we found that a coil consuming less than 75 watts of current would ignite oil of a gravity far below anything being used today. This current consumption is lower than for any other device that might be used or operated electrically to accomplish the same purpose, and the cost of gas is really prohibitive when compared with it.

The use of the induction coil operating at the same voltage as the

(Continued on page 70)

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*Voge Electric Company, Chicago.

Preliminary Survey for Installing the Domestic Burner

By George W. Graves*

COMPLETE surveys, as taken by the heating engineer, consist of three interlocking reports. First the engineer's report covering his inspection of the premises as well as the entire heating plant. Second, the installation data or layout sheet. Third, complete bill of material covering all materials to be used in actual installation. These can be in the form of one report or three separate reports, but in any event, they should be entirely completed by the engineer when the survey is being made.

This is but the first of a series of articles on subjects pertaining to domestic burner installation that will be written by Mr. Graves. The second, dealing with boiler rating and determination of whether or not there is correct relationship between the total tax and the boiler capacity, will appear in an early issue of **Fuel Oil.**

The engineer's inspection report is very important. On this report depends not merely acceptance or rejection of the order, but the successful operation of the burner after installation as well. Unless it is thoroughly exact and carefully calculated, this report is practically useless.

The report properly filled in should give the following information: Name and address of the owner; type of building, construction, and purpose for which it is used; number of stories and rooms; whether or not windows are equipped with storm windows or weather stripping; type of heating system; name, number, capacity of boiler or furnace, and information as to whether or not the boiler and piping are covered; quantity, size and length of the mains and returns; apparent condition at time of inspection of the boiler, dampers, flue and chimney, including information as to whether or not they should be repaired. Total standing radiation, detailed on another sheet, is set forth together with additional tax on the plan for all piping and domestic hot water coil, if used, which added, gives the total tax of the system; size and area of the grate, size of ash pit and recommendation regarding actual setting of the burner in the plant, stating whether burner should be installed through ash pit door or entire ash pit front removed; where premises are equipped with hot air furnaces, the size and quantity of cold air intakes or ducts and sizes and locations of grills, size and quantity of hot air pipes should be stated.

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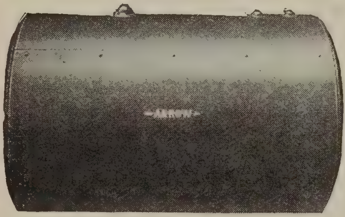
*Engineer, The American Nokol Co.

Ask Us!

for expert advice on your tank installation.

»ARROW→

tanks are unconditionally guaranteed. Send for Price Sheet 0405.



The Novelty Steam Boiler Works Co.
929 S. Howard St. Baltimore, Md.

NATIONAL AIROIL BURNER

Airoil Burners

"are efficient"

The Complete Design and Installation of Oil Burning Systems

National Airoil Burner Co.
916 Thompson Street
Philadelphia

In addition, the total area of cold air ducts and hot air pipes in square inches and cubical contents of premises and B. t. u. requirements should be shown. A special space should be provided for designation of kind of electrical current furnished; namely, A.C. or D.C., and voltages and cycle.

Headings of the columns should include: Name of room—living, dining, etc.; direction of exposure; size of doors and windows, with sash measurements; quantity and size of radiators, with height in inches, number of sections, and columns per section; installed radiation derived from these figures; required radiation derived from data in preceding columns; cubical contents of room.

Having tabulated existing column radiation, conversion to square feet of standing column radiation can be located in the proper table in *The Ideal Fitter* published by the American Radiator Company or in all handbooks on heating and ventilating engineering.

How To Calculate Radiation

In calculating radiation, Mill's Rule, which has been generally accepted as satisfactory for practical purposes in residence heating, can be applied. The rule in simple is: To the square feet of windows and doors divided by two add the square feet of exposed wall surface divided by twenty and the cubical contents of the room divided by 200. The total is the square feet of standing steam radiation required.

In the event exposure of the room is north, northeast or northwest, ten

The Security Oil Burning Furnace

THE GREATEST CONVENIENCE YOU CAN HAVE IN THE HOME

MR. DEALER—The demand for a satisfactory oil burner exists in every community. The liquid fuel age is here. The energetic merchant who has the courage to get out of the rut and the vision to appreciate the possibilities of the SECURITY OIL BURNER will make a worthwhile profit.

While the Security Oil Burner will fit any make of furnace, it is especially built for our own Security Warm Air Furnace. *It is a power-driven burner that does not make smoke or odor—does not form carbon—is not noisy and can be sold at a moderate price.*

30 Years of Successful Manufacturing

FULLY GUARANTEED

Ask for our Furnace and Oil Burner Catalogs.

Security Stove & Mfg. Co.

KANSAS CITY, MO.

Phone Benton 7144

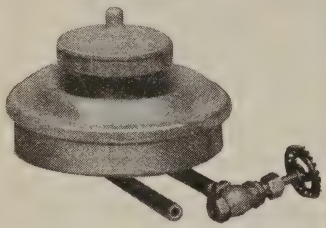
17th and Oakland Ave.

WE SPECIALIZE
IN
FUEL OILS
GAS OILS
FOR DOMESTIC OR
INDUSTRIAL PLANTS

DELIVERED EITHER IN
TANK TRUCKS OR
TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

OHIO REFINING COMPANY
TELEPHONE RIDGE 884
CINCINNATI, OHIO



The "Superior"

New Invention. Combines Water, Steam, Air and Oil-Gas. Powerful White Flame. Gravity Feed. No Motors. Smokeless, Noiseless, Sootless. Low Price. Five Sizes, For Every type and Size Furnace, Boiler, Stove. State and Co. Agents wanted.

SUPERIOR OIL-GAS BURNER CO.
453 N. Racine Ave., Chicago

per cent should be added, and twenty per cent if radiation is concealed. If radiation is hot water instead of steam, sixty per cent should be added.

After verifying existing standing column radiation with radiation required additional tax imposed on the system for piping should be considered. While practices vary, it has been customary in the past to add twenty per cent to the total standing column radiation when boiler and piping are covered and thirty per cent when not covered; however, later practice is to increase these figures to thirty-five and fifty per cent respectively.

Where the domestic hot water tank is connected to the boiler and utilized in connection with a heating coil or cast iron section, additional tax must be added at the rate of one and one-half square feet of direct radiation for a steam boiler or two and one-half for hot water for each gallon of water to be heated per hour.

Massachusetts Lists Sun As Standard

According to a recent announcement by the Heat Equipment Corporation, Lincoln, Neb., a New England distributor of the Sun Oil Heater, which is manufactured by the Heat Equipment Corporation, has succeeded in having it approved and listed as standard by the State of Massachusetts. A further announcement is to the effect that 100 new dealers, all over the United States, have been obtained by the Corporation since the first of this year.

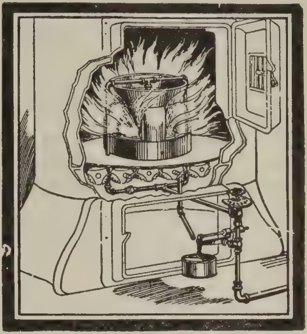
June Fuel Oil Demand Shows Decrease

Gas and fuel oil production in the United States showed a slight decrease during June, when the total amount produced amounted to 1,106,711,936 gallons, which was 49,223,844 gallons less than the total for May, but 126,842,063 gallons more than the total for June, 1923. Domestic demand totaled 946,508,181 gallons in June, compared with 1,066,387,508 gallons in May and 822,402,120 gallons in June, 1923.

Stocks of gas and fuel oil on hand at refineries on July 1 amounted to 1,618,563,529 gallons, an increase of 52,900,653 gallons since June 1, and about 295,000,000 gallons more than the stocks on July 1, 1922. Exports increased approximately 8 per cent during June and imports decreased about 25 per cent. The former also showed a healthy increase over the same period last year, while the latter exhibited a slight decrease.

Standard Markets Only One Burning Oil

To simplify its problem of supplying oil to domestic burners, the Standard Oil Company of Indiana, which last year handled as many as six grades of oils for domestic burner use, has settled upon only one grade of oil for this year and is marketing it only from its larger centers of distribution throughout the Middle Western territory of twelve states. The oil is being marketed as a furnace oil and it is claimed by the company officials to be suitable for use in any domestic burner of usual design.



2800 Worthington Burners in Kansas City alone.

Seventh successful season. More reputable dealers wanted.

Write today.

Worthington Oil Burner Co.
1322 McGee, Kansas City, Mo.

KELLOGG COMPRESSORS

Air Compressors.

Vacuum Pumps.

Special Oil Burning Equipment

Our engineering and production departments are at your service in increasing your output of Oil Burners.

Send Direct

KELLOGG MANUFACTURING COMPANY

Rochester, New York

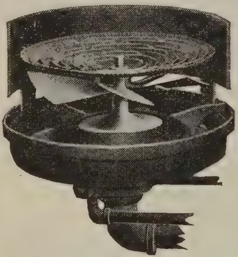
N. Y. Skyscraper To Burn Oil

Another New York City skyscraper whose heating plant is being equipped to burn fuel oil is the new home of the Equitable Life Assurance Society which is being built on Seventh Avenue and 31st Street. The heating plant is of the steam generating type. The building, when completed, will be 22 stories high and will have a floor area of 15 acres.

Colmar Has Specially Built Furnace

"Warmth Without Worry" is the title of a booklet distributed by the Colmar Automatic Heating Company, Emeryville, Cal., to announce the Colmar burner. This burner is made in several different styles to be used in various types of furnaces and stoves. A special hot air furnace known as the Hotomatic is also manufactured by the same company to be used with the burner. The latter is an automatic vaporizing type, with a large square honeycombed plate in and upon which the oil vapor is burned. An electric pump furnishes force feed, according to the booklet and automatic ignition is accomplished by means of generator that is heated by electricity.

In 1914, 3.1 per cent of the world's total gross tonnage used oil either in motor ships or as fuel under boilers. In 1924 that percentage has grown to 28.88.



Rotary Oil Burners

A Size for Every Need

The Rotary Oil Burner is manufactured in all sizes. From the small burner for the home dwelling up to the burner for the largest office building the Rotary is proven the most economical. There is no waste fuel using this perfected burner. Cheap fuel oil of only 26 gravity may be used. The Rotary is very simple in operation and requires practically no attention.

We will be very glad to furnish you directly with the details of the Rotary—just drop us a line.

ROTARY MANUFACTURING COMPANY
1526 Santa Fe Avenue **Los Angeles, Calif.**
Established 1908 **Handled by distributors**
Chicago, St. Louis, San Francisco, Oakland and others.

THE BASEL TYPE E-3 HEAT REGULATOR

is now equipped complete, with Thermostat, magnetic control, mercoid switch for operating motor, valve, automatic cut-off, of both oil and motor from overflow of oil to trip bucket, Thermostat control and automatic cut-off each being independent of the other.

Hand control independent of either the Thermostatic control or automatic cut-off.

Removable strainer, air seal, enclosed in steel case.

In fact everything in a nut shell. What more do you want? For Mechanical or Gravity Feed burners.

Basel line of valves and heat regulators are made in seven types. Two of which are approved and listed as standard by the Underwriters Laboratories of the National Board of Fire Underwriters.

All frictionless and packingless.

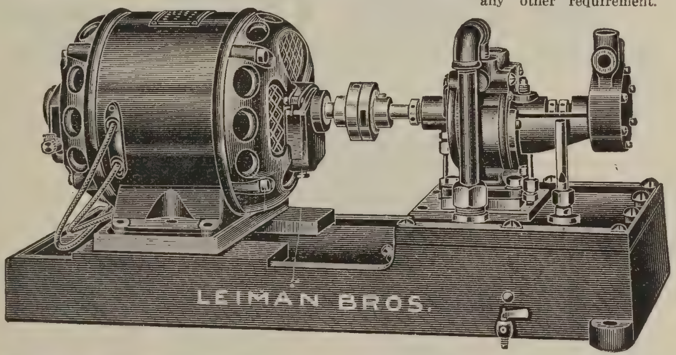
The Basel line of valves and heat regulators are not just ordinary valves. They mean advanced theories in Heat Regulators and Valves and Valve control construction.

Valves and valve control is our hobby. Literature on request.

911 Mulberry St. **BASEL MANUFACTURING COMPANY** Kansas City, Mo.

The Reliable Oil and Air Pumping Unit for Fuel Oil Burners That Makes Oil Heating Popular

Size suitable for Homes, Apartments, Hotels, Institutions, Factories, Greenhouses, Office buildings or any other requirement.


LEIMAN BROS.

For atmoizing at low pressures
7 sizes, Prompt Deliveries
Proper atomization—Intense Heat—Simple Construction.

NOISELESS

Self-Lubricating
Wear Compensating

LEIMAN BROS. 60 LISPENARD STREET NEW YORK **35 Years Experience**

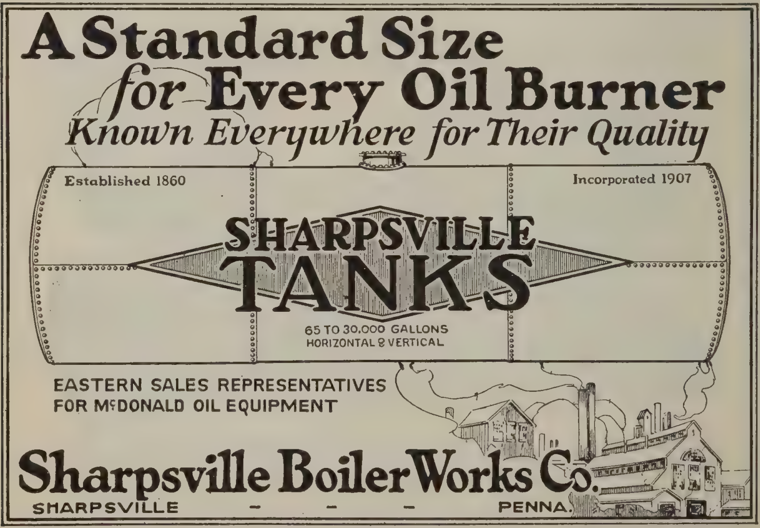
Data For Firemen Given By Simplex

Fuel oil data tables of interest to heating engineers and oil burner firemen and attendants is included in a circular published by the Simplex Fuel Oil Engineering Company, Inc., New York City, manufacturers of the Simplex mechanical oil burning system. Information and instructions for the operation of the burner are also included. The Simplex is made in both the natural and forced draft types, for domestic, industrial or marine plants.

"Oil The Modern Fuel"

Readers are told that "You don't need coal—burn modern fuel for house heating," in a pamphlet which has been issued by the Baker Steam Products Company, New York City, advertising the Baker Burner. The Baker is an automatic, electrically controlled and electrically ignited burner, using an air blast system of atomization. Its combustion chamber, into which oil is thrown from an atomizing nozzle, is of the pot type. A pressure pump oil feed is used.

Statistics gathered by a large industrial concern show that in some cases of oil burning the cost of air amounted to nearly one-third the cost of the fuel. This is "burning air" with a vengeance. Engineers say with proper design it is possible to provide pressure air at cost of not more than five per cent of the cost of oil.


A Standard Size for Every Oil Burner

Known Everywhere for Their Quality

Established 1860

Incorporated 1907

SHARPSVILLE TANKS

65 TO 30,000 GALLONS
HORIZONTAL & VERTICAL

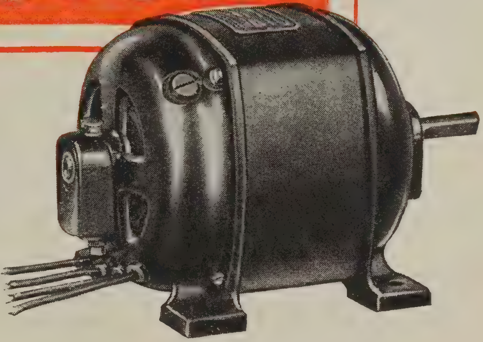
EASTERN SALES REPRESENTATIVES
FOR McDONALD OIL EQUIPMENT

Sharpsville Boiler Works Co.

SHARPSVILLE - - - PENNA.

Leland Motors

Efficient
Quiet
Dependable
Durable
Simple
Sturdy



Leland motors are designed to meet all the requirements of the oil burner motor. Unfailing service is the life story of each.

They operate smoothly and quietly always—even under the most unfavorable conditions.

Do not stall.

Keep current consumption and power costs to a minimum.

Have a temperature rise of only 30° C. Have large oil reservoirs that make frequent oilings unnecessary.

TYPES

Alternating Current—Repulsion Induction Direct Current—Compound Wound. Frames interchangeable. Sizes: 1/8, 1/6, 1/4, 1/3, 1/2, 3/4. H. P.

Let us send you a Leland—charges prepaid—to test in your own plant. No obligations.

Write today.

The Leland LE Electric Co.
Dayton Ohio U. S. A.

INDUCTION COIL IS LOGICAL IGNITION DEVICE

(Continued from page 58)

motor eliminates any necessity of transformers for alternating current or other devices to furnish direct current in the ignition circuit. It can, however, be controlled through either high (110 or 220) volts) or low voltage. It should be able, also, to stand at least one to two hours continuous operation so that the slightest failure on the part of the control would not mean a broken down coil. It is not advisable to attempt to run the coil during the entire period of burning, though, for it will shorten the life of the vibrator points and the heating of the electrodes of the spark plugs would materially affect the current consumption. The electrodes should be from three thirty-seconds to one-eighth of an inch in diameter and should be set at approximately a gap of three-sixteenths of an inch, so adjusted that the spark will jump fairly close to the inside edge of the fuel spray.

Should Eliminate Service Men

The ignition system should be so designed as to make possible the replacing of used parts by the owner, for the visits of service men are not always profitable, largely because the men are prone to waste time and, not being salesmen, their conversion does not always do the burner or the burner parts, justice.

There seems to be much talk of electrical ignition being "patented in principle" for oil burners. Such talk is illogical, as this type of ignition was used in the automotive

Big rewards await you

in the oil burner field if you are energetic. We want men of ability as distributors for the

Warner Oil Burner

The *Warner's* new and tested exclusive advantages will make selling easy.

THE WARNER is a gravity feed oil burner which is *practically noiseless.* Its natural draft simple construction makes it wonderfully efficient. Its economy of operation rivals only a low initial cost that makes them sell readily. The oil Burner field is still in its infancy, so the opportunity for success is not restricted. Small capital, the will to win, and intelligence is all you need.

Write for particulars to

L. F. Warner Manufacturing Co.
New London, Conn.

and gas engine field long before the advent of the oil burner and the timing and control of switches has also been done mechanically, as well as automatically, in the applications referred to, for a number of years.

There is no reason why the oil burner manufacturer should not avail himself of this, the only logical ignition system from every standpoint, for it made the modern automobile a possibility and the electrical manufacturer can build coils for this purpose that are as reliable as any used for similar work.

Ballard Booklet Is Good One

Much information for those investigating oil burning equipment is included in a booklet issued by the Ballard Oil Equipment Company, New York City. This concern manufactures oil burners and also maintains a fuel oil supply service throughout the New England States and Canada. Their burning systems are made to employ high or low pressure, steam or mechanical atomization, and to be installed in the larger heating plants. The booklet contains many useful tables and bits of information in reference to oil burning, including metric table conversions, steam property tables, calorific values of various fuels, and tables for computing tank capacities.

A new fuel oil tank gauge known as the Petrometer has been placed on the market by the Porter Electric Carburetor, Inc., New York City.

HORIZONTAL and VERTICAL
FUEL OIL TANKS

Buffalo Fuel Oil Tanks guarantee perfect freedom from leaks. They are the product of specialists in the tank business for many years. A size for your particular needs.

Write today for attractive prices and Bulletin No. 212.

GUARANTEED FOR FIVE YEARS
BUFFALO TANKS
MADE BY
Kaustine Company Inc.

KAUSTINE CO., Inc.
Manufacturers & Engineers
BUFFALO, N. Y.

Nationally known as the manufacturers of Kaustine Septic Tanks.

Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers". It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York

Branch Offices in the Larger Cities

SUPPLYING THE PROPER DOMESTIC FUEL OIL

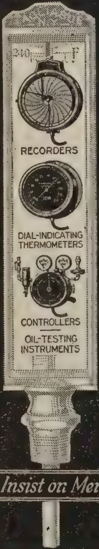
(Continued from page 17)

versed oil man would flatly refuse his order, after failing to sell him the proper grade of oil, knowing in doing so he was rendering a real service.

Should the new oil burner owner find an oil company to deliver the low heavy grade, trouble would immediately start for everyone. The heavy oil, intended only for industrial purposes or large hotels or apartment buildings, would clog the fine screens in the domestic burner and load its small orifices and sensitive adjustments with carbon. The house would get cold, the burner company would be called on for expensive service which they should not be expected to render, and for which they could hardly expect pay, and finally some oil company would have to send two trucks to the house, one to pump out the wrong oil, which would have become stiff from the cold, from the storage tank, and the other to fill it with the proper oil—all this trouble; expense and dissatisfaction on account of a thoughtless salesman and an oil company insensible of its obligations to its customers.

Baume Not All-Important

In the Chicago territory nine grades of oil are being used, ranging from 18-20 Baume Smackover crude to 38-40 Baume distillate. The Baume of fuel oil does not necessarily indicate the propriety of its use as a domestic heating oil. Always the cold test should be taken into consideration. By the cold test



Safety in Oil Burning

THE **TAG** Shut-off Valve, connected in the fuel lines of oil-burning boilers and other devices, automatically shuts off the oil flow the instant that the steam or air pressure used for atomizing falls below the required minimum. The TAG Valve LOCKS ITSELF and cannot be reopened until the trip lock mechanism is reset by hand, even though in the meantime the atomizing pressure has been brought up to the required point. Absolutely prevents oil leakage into furnace. Our engineering department will be glad to advise you on the application of this dependable protection to your large or small oil-firing installation.

Send for Bulletin F-468

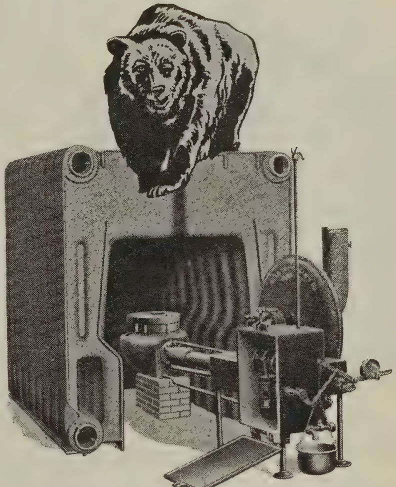
C. J. TAGLIABUE MFG. CO.
18 TO 88 THIRTY-THIRD ST., BROOKLYN, N. Y.

Insist on Mercury Thermometers with the TAG-Hespe RED Reading Column

SINCE 1769

Nine Reasons

Why **Bear** Users Are **Enthusiastic**



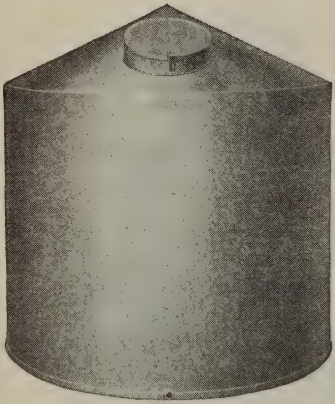
1. They get perfect combustion.
2. They get a reduced fuel cost.
3. They are no longer dependent on the furnace man.
4. Their homes are always kept at a uniform temperature.
5. Their investment in coal, and the uncertainty of supply are eliminated.
6. Their days of running to the cellar to force, or to check the fires, are memories of the past.
7. They are no longer bothered with dust and ashes filtering through the house and covering costly furniture and draperies with destructive dirt.
7. They are rid of unsightly coal bins, and can now keep clean, tidy basements.
9. They get HEAT when wanted—100 per cent. HEAT. No waste, no bother, no dirt.

The Bear Burner is a Reliable, Durable, Automatic and Efficient Oil Burner, and can be installed in any style Coal Burning Furnace. It is Made Right and Sold Right.

Bear Combustion Co., Inc.

York, Pennsylvania

FUEL OIL TANKS



Vertical or Horizontal
65 to 35,000 gallons

Built by expert workmen. Tested under air pressure. Guaranteed oil tight. Immediate delivery. Write for prices and specifications.

Standard Steel Works

1606 Holmes Street,
North Kansas City, Mo.

is meant the lowest temperature at which the oil will still be a free flowing liquid, not congealed. Straw colored gas oil, 32-36 Baume, is one of the most popular oils for domestic heating, but there are gas oils having a clear color and meeting this Baume specification, which are absolute solids at 30 degrees above zero. I recall the experience of one man in a Chicago suburb to whom I had sold a burner and a 3,000-gallon tank a few years ago. One cold night I received a message that the burner wouldn't work, although the tank was full of oil. On taking up the suction and return pipe between the tank and the house, which were eighteen inches underground, we found that the gas oil in these pipes was frozen solid and resembled a wax candle driven into the pipes. This was 32-36 gravity straw colored gas oil, but it didn't have the proper cold test.

Zero Cold Test Best

For domestic heating one should never attempt the use of an oil having a cold test higher than zero Fahrenheit. Because an oil storage tank in the basement does not alter the cold test specification. The oil without the proper cold test may become congealed in the oil truck or in the fill pipe from the truck to the tank. Neither is a burner which constantly circulates the oil from the tank to the burner, returning the excess to the tank, sufficient in itself to warrant the use of an oil without thought to the cold test. Most domestic burners are automatic in operation, being run only when the temperature is below the thermostatic setting. Such machines usually operate not to exceed a total of eight hours out of twenty-four in the coldest weather and the oil can become very cold during intervals when the burner is not operating.

Fuel oil for domestic use should be "sweet odor" and not an oil having a nauseating sulphur odor which permeates the house.

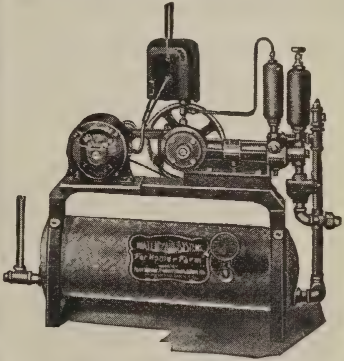
A man is willing to invest hundreds of dollars in an oil burner installation to eliminate the care, worry, dirt and uneven, inadequate heat of a coal fire. Yet all of these advantages of the investment can be nullified by unintelligent recommendations of a suitable oil. Quality and service should always be the first consideration in buying oil for domestic heating. The advantage of a slightly lower price means nothing at the expense of quality.

Schroeder With Underwriters Burner Division

Major Paul O. Schroeder, former United States Army airman who established a world's altitude record a few years ago, is now associated with the oil burner division of the Underwriters' Laboratories, Chicago. Major Schroeder resigned from the army air service some time ago. He is credited with having been the instructor of several of the fliers who are now in the personnel of the cross-continent air-mail service.

Heating equipment and oil burner systems will be manufactured by the Oil Appliance Company, recently formed in Jersey City, N. J.

"PAUL" OIL PUMPING SYSTEM
For Oil Burner Service
SOLVES THE PROBLEM



The "PAUL" Oil Pumping System will pump oil from any source of supply (large storage tank) where the maximum lift will not exceed 22-feet. It gives a constant supply of oil through reducing valve to burner. It supplies oil at the right temperature. It is quiet in operation. It is efficient and economical.

The "PAUL" Oil Pumping System consisting of a self-priming, self-lubricating pump, belted to a special heavy duty pump motor; a small galvanized supply tank, automatic controller, pressure gauge, relief valve and discharge line between pump and tank. Completely assembled. Shipped ready to install.

Full information and prices sent upon request—Bulletin No. 5027.

Manufactured by
FORT WAYNE ENGINEERING & MANUFACTURING COMPANY
Main Office and Factory
Fort Wayne, Indiana
Branch Offices in all Principal Cities.

U.S. GAUGE CO. N.Y. **GAUGES** U.S. GAUGE CO. N.Y.

PRESSURE—VACUUM

All sizes and types for every purpose.

Service our Solicitor

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Chicago

44
Beaver St.,
New York

WEBER BROS. METAL WORKS

Oil B Dept.

108 N. Jefferson St. Chicago, Ill.

Are equipped to make to your specifications metal floats, trip buckets, special sheet metal work, stamping and machine products.

Let us figure with you

Aeroil Burner Co., Inc.

Union Hill, N. J.

Manufacturers of
Portable Oil Burners for heating
Pitch and Asphalt Kettles
Oil Burning Asphalt Kettles
Lead Melting Furnaces
Kerosene Blow Torches

Good Sideline for Oil Burner
Salesmen

New Valve Gives Added Protection

Protection to oil fired boilers and furnaces by automatically shutting off the oil supply when the atomizing pressure fails or is reduced below the required minimum, is offered by a new Sylphon interlocking valve recently perfected and placed on the market by The Fulton Company, Knoxville, Tenn. The valve is installed in the fuel line and the pressure of the atomizing supply is admitted to the sylphon bellows chamber through a small opening, as long as the atomizing pressure remains above the minimum for which the valve is set. According to a pamphlet recently issued by The Fulton Company, the Sylphon bellows is made in one-piece, all-metal, and seamless.

Furnace Burns Oil or Gas

An air preheating furnace that burns either oil or gas or a combination of the two has been announced by the Combustion Equipment Company, Kansas City, Mo. The preheating is accomplished by passing the air through ducts immediately under the combustion chamber and discharging it upward into the chamber. It is claimed that the preheated air reaches the gas or oil burners at a temperature near that necessary to flash the fuel.

A new vaporizing oil burner known as the Superior Oil-Gas Burner, has been placed on the market in Chicago by the Superior Oil-Gas Burner Company of that city.

No Motor—No Blower—No Carbon

The simplest oil burner made is now ready for the market. Designed and perfected by skilled engineers, no motor or blower is necessary. This cuts the demand for service at least two-thirds.

Our patented method of vaning the vapor plate—it is cut like a child's toy windmill—leads the air directly into the flame. This method of distributing the air makes perfect combustion possible.

The Schulse-Simplex burns without smoke, soot or carbon; there are no clogged or dirty pipes even at the end of the winter.

This burner can be quickly installed and owing to the remarkable simplicity of its design, the requests for service are exceedingly light.

The burner is very reasonably priced, and is well within the means of the average family. This means an enormous market.

Certain territories are still open to exclusive dealers and we make them an exceedingly attractive proposition. Write, wire or phone for details.

SIMPLEX FUEL OIL ENGINEERING CO., INC.

11 Broadway, New York City
Telephone: Bowling Green 7710

TANKS
Electric Welded
Fuel Oil
Gasoline Air
Welded Pipes and
Pipe Lines
SMITH—HAMBURG—SCOTT
WELDING CO.
of N. Y., Inc.
Tank Plant
Marion St. and Harris Ave.
Long Island City
New York

Offices and Shops
505 West 57th St.
New York City

LET'S HAVE CORRECT STORAGE TANK INSTALLATIONS

(Continued from page 16)

for leaky tanks are costly to replace. A container constructed of 3/16 inch plate, by any responsible tank manufacturer, enjoys a long life and need not be encased in concrete. Buried in sand or clay, the life of such a tank is claimed by the Bureau of Standard at Washington, D. C., to be 30 years. This bureau's claims are always ultra-conservative, so the tank's life might reasonably be placed at twice that period. One more fact in favor of a 3/16 inch thickness for underground tanks is that the Underwriters prescribe such material.

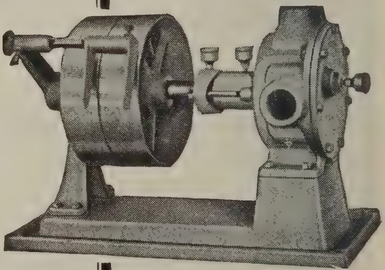
The tank pit should be dug at least five feet away from the foun-

A Big Capacity Pump

An improved pumping principle gives the VIKING pump its greater pumping speed. At the same time, very little operating power is required. Only two moving parts—therefore, the life is long because wear is reduced to a minimum. Easy to install; then, delivers unfailing service for years without attention.

Viking Pump Co.
Cedar Falls, Iowa

VIKING PUMPS



New, enlarged Viking catalog just off the press. Send name today for your copy.

ACE AUTOMATIC OIL BURNER

The Ford of The Oil Burner Industry.

You are overlooking the best bet in this business if you lose out on this burner for your territory.

Write now.

OIL BURNER
& REFRIGERATING
COMPANY
819 Chicago Avenue
Evanston, Illinois

Oil Pilot
+
No Gas
+
1/20 h.p. Motor
+
One moving part
+
Two hrs. for Installation
+
Retails for $290.00 with Automatics and tank

WHY OHIO?

When you remember that Ohio *Ball Bearing* Motors run thousands of hours without further oiling, you have another reason why Ohio has so many satisfied customers.

The more satisfactorily your "Oil Burner" works, the less attention the user will probably give the motor. Regular oiling will quite likely be forgotten, so a reliable motor that will run thousands of hours, without further oiling, and even then will not stick or burn out, is a final positive assurance of satisfied customers.

Send for Bulletin No. 204.

THE OHIO ELECTRIC AND CONTROLLER COMPANY
5920 Maurice Avenue, Cleveland, Ohio.

SETS NEW RECORD

On Low Service Cost

OIL-O-MATIC, the remarkable new-type oil burner, by actual test, requires less servicing than a high grade washing machine. One service call for each 104 hours of running time was the best any electric washer could show. OIL-O-MATIC operated 1050 hours, ten times as long, with only three service calls. Two of those calls were for trouble not in the burner. The third was for a minor adjustment.

Get full information on the oil burner that has been proved for five years. Some desirable territory still open for live dealers. Write today.

C. U. WILLIAMS & SON
Main Office and Plant
Bloomington, Ill.
Branches in all leading cities

WILLIAMS
OIL-O-MATIC
HEATING

dation walls, and of sufficient depth that the top of the tank, when installed, is at least two feet below the lawn grade. The tank should be lowered into the pit gently, not rolled or dropped in. Neither should the tank be buried in ashes, for water seeping through ashes forms an acid that attacks the metal.

Cleanly galvanized iron fittings should be used throughout and a thin coating of orange shellac should be used on all pipe joints. Swing-joint connections should be used on all pipe lines running from the top of the tank, as this precludes a cracked pipe joint in case the tank settles. Provision should also be made for venting and gauging the tank and, if it is located a distance from the curb or alley, an extension fill line should be run underground to the point of fill to be more accessible when the oil is delivered. This line should terminate in a cast iron fill cap with provision for locking. Then children will not be tempted to fill the line with pebbles and miscellaneous objects.

Heat Equipment Issues New Catalog

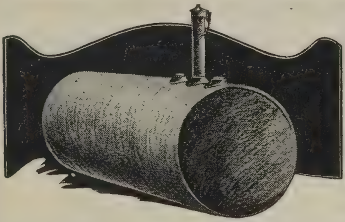
An illustrated catalog of the Sun Automatic Oil Heater and auxiliary equipment was issued recently by the Heat Equipment Corporation, Lincoln, Neb. A list of heating units with built-in burners, including a garage heating unit, camp stove, brooder and small heating stove, is also contained in the catalog. The Sun burner proper is made in a number of different sizes for use in heating devices ranging from heating stoves to furnaces.

MAKING THE DOMESTIC OIL BURNER AUTOMATIC

(Continued from page 14)

which the regular pressure control is set. Another method is to use the same type of control as employed on a hot water system, with a remote stem, this instrument being set to operate at the degree of temperature equivalent to the steam pressure ordinarily carried, so that in the event of low water failure and no steam pressure the temperature rise would automatically stop the burner.

For close regulation, for large apartment buildings, stores, etc., a lever arm diaphragm regulator is used, in connection with a trip switch. By adjusting the weights on the lever arm of the regulator, any desired pressure or temperature may



STORAGE TANKS

For Furnace Oil

- —Best open hearth steel
- —Welded seams and flanges
- —Tested oil tight
- —65 to 2000 gal. capacity.

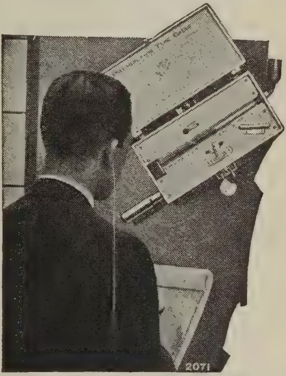
Write for Prices

GILBERT & BARKER MFG. CO.

Springfield, Mass.

KNOW

How Much You Get
How Much You Burn
How Much You Have



Pneumercator Tank Gauge

is an exceedingly simple and accurate instrument on your wall, which tells you just how much is in your underground tank at any time.

Non-electrical — Absolutely safe. Approved by "Fire Underwriters." Endorsed by Oil Burner Mfrs.

You Can't Afford To Do Without One.

Write Us.

PNEUMERCATOR CO., Inc.

40 Flatbush Avenue Extension,
Sperry Building
Brooklyn, N. Y.

be maintained. This type of control is also in general use on vapor systems.

Heat Response Is Swift

From tests conducted by the Underwriters' Laboratories, it was determined that a safety limiting device on warm air furnaces was quite essential, as this type of heating plant, under proper conditions, is ideally adapted for use with an oil burner. The heat response to starting the burner equipment, in a properly installed furnace is practically instantaneous and, while it is possible to control the supply of oil so as to govern the amount of heat to the warm air registers, it is well to guard against any accidental change in the oil supply, which might create intense heat, causing overheated registers and the possible hazard to inflammable material near or immediately above the furnace.

For this purpose special types of furnace controls have been developed, having remote stem for insertion in the dome of the furnace casing, or in a warm air duct.

Their function is quite similar to that of the hot water boiler controls and the remote stem may be adjusted to secure the proper regulation of temperature, depending upon the particular installation, the proper range and setting being determined after the installation tests.

There is no doubt that domestic oil burning is here to stay; it is a well-recognized fact that the present efficiency of the automatic controls has done a great deal to bring about the steadily increasing popularity of the domestic oil burner.

Teesdale Pumps for Oil Burners

Dealers and Distributors

Write for special trial offer on our Type B Pump, with motor on base. This unit is designed for dealers, and is specially adapted to gravity feed burners. It will supply either gravity or pressure burner directly from outside tank or supply a small inside tank with float switch.

Teesdale Oil Pumps Have

- Noiseless operation
- Very high suction lift
- Simple yet durable construction
- Direct operation at motor speed
- Capacity, 30 gallons an hour and up.
- Only three moving parts, oscillating type.

For Manufacturers

We build to order to meet your special requirements.

TEESDALE MANUFACTURING COMPANY
320 Douglas Street **Grand Rapids, Michigan**

FUEL OIL

FOR HEAT and POWER

Devoted to developing and encouraging the efficient, scientific use of oil fuels.

Published Monthly

Vol. 3 October, 1924 No. 4

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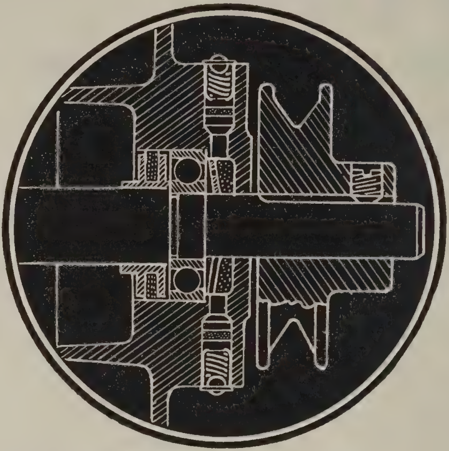


No Oil — No Trouble

Bearings cause most of the trouble in the average sleeve-type Oil Burner Motor. Your own service department records will undoubtedly bear out this fact.

Lack of Oil or infrequent oiling is the cause.

Ohio Ball Bearing construction shown in the sketch eliminates the necessity of frequent oiling. In fact Ohio Motors run thousands of hours without further oiling and will not stick or burn out.

The slight additional cost of Ohio Ball Bearing construction is well justified by the fact that service records of many Ohio Users, show that service calls due to defective OHIO Motors have never risen over a mere fraction of one percent.

The Ohio Electric & Controller Co.
5920 Maurice Ave. - - - Cleveland, Ohio

OHIO MOTORS
Ball-Bearing

FUEL OIL
FOR HEAT and POWER
Devoted to the efficient burning of oil

Vol. III. Printed at New York No. 4

Preparing the Water-Tube Boiler Fire Box for Oil Burning

How to Arrange the Baffle Wall, Bridge Wall, Checkerwork and the Burner Itself

By C. C. Hermann

JOINTS between the baffle wall and the bridge wall of the water-tube boiler must receive special attention to take care of expansion. The baffle wall includes all of the horizontal tubes in its construction and in order to facilitate removal and to avoid destruction of the wall by their expansion, it should not grip them too tightly. The ordinary method of making this connection is to place several layers of asbestos between the baffle and the bridge wall, thus making a gas tight joint and also eliminating the expansion danger.

Plastic Baffle Material Is Better

Sooner or later the tubes will need to be replaced and they must be drawn out of the baffle. If asbestos fibre is packed between the tube and the baffle or a plastic cement is placed about the tube its removal will be an easy matter. The filling may then be chipped out without destroying the baffle blocks and only in case of a badly distorted tube is it necessary to break up any part of the baffle. In case special baffle blocks are used such broken blocks may be replaced.

Bridge Wall Can Be Eliminated

In some installations the bridge wall is eliminated entirely and the rear wall set at an angle to connect up with the baffle. Asbestos fibre is placed between the baffle and the wall avoiding a direct connection between these two elements.

The bridge wall and the baffle wall may cause more trouble in the oil burning setting than any other element unless properly constructed. Many power plant men have found this out through experience when changing from coal firing to oil firing particularly in the water-tube boiler setting. This is primarily due to the expense connected with moving the baffle and bridge wall when changing. If the oil has been allowed to strike the bridge wall before it has been thoroughly burned, causing carbon deposits and a high differential between the sides of the wall, the wall crumbles readily resulting in heavy replacements from time to time.

Where the importance of adequate checkerwork on the grate to admit the proper volume of air for combustion is ignored and proper consideration for furnace valume is lacking, repairs are often necessary. The power plant man, because of the additional expense, may overlook the necessity of removing the bridge wall to a point further back, or dropping the combustion chamber floor, but he will soon find out that the results of too small combustion space are eroded side walls, crumbled bridge wall and burned out tubes, as well as dense heavy smoke if the boiler rating is to be maintained. This condition, which accounts for the inability of many installations to meet regular ratings, is easily cured by the indicated changes in the setting.

When Mr. Hermann says, "Where the importance of adequate checkerwork on the grate to admit the proper volume of air for combustion is ignored, and proper consideration for furnace volume is lacking, repairs are often necessary," he is touching on two of the most important phases of oil burner installation, for unless some cognizance is taken of these factors, success of the burner, regardless of its design, is a matter of chance.

Location of burners with respect to the side walls, to the checker work and to each other, and getting the proper length of combustion chamber according to the flame travel, are features that are available from experience and should be part of every installation, or change from coal to oil firing. The angularity of the baffle wall to obtain a given taper to the gas passage must be recognized in order to provide for the shrinkage of the gas due to cooling and to maintain uniform gas velocity.

By removing the bridge wall to a point further back, than it is usually placed for coal firing, the advantage of exposing the two lower tubes to the radiant heat of the flames as well as the reflected heat from the incandescent fire lining of the combustion chamber is obtained. The furnace is thereby increased in capacity and the boiler responds more readily to varied steam demands.

There are several very desirable designs of baffle walls for use with the water-tube setting, one being the Turner, which may be built at any desired angle to give the correct taper to the gas passage and a uniform velocity to the gas stream. The builders of this baffle claim that the furnace temperatures are lower for two distinct reasons: first, the lower rows of tubes absorb the heat more quickly, and second, the wide opening of the first pass permits the

(Continued on page 74.)

Burners Bring Savings in Power Plant Costs

By Walter Kingsley

SAVINGS varying from $5,000 to $9,000 monthly in the cost of generating steam, electric power and compressing air in its power plant at Parsons, Kan., are being made by the Missouri-Kansas-Texas Railroad through the installation of oil burners. The boiler room equipment consists principally of five 516-h.p. Babcock & Wilcox Sterling type, oil-fired boilers designed for 200-pounds of steam pressure. One hundred degrees of superheat is maintained with Elesco superheaters. At present, under normal operating conditions, two of the boilers operating at 165 per cent rating are in service at one time.

Equipment Is Up-to-Date

The boilers have back-shot type Peabody burners and draft is provided by a radial brick stack 200 feet high and 10 feet in diameter. Exhaust steam is used to heat the fuel oil and keep it fluid. Oil pressure to the burners is maintained by automatic reciprocating pumps. The feed-water temperature is kept at approximately 216 degrees F. by a feedwater heater with a measuring and weighing device. Water treated to eliminate scale formation is used for feedwater.

The water is pumped into the boilers by two duplex pumps that are controlled by an automatic water regulators. On each boiler front, where the firemen can see them, are indicating gages showing steam pressure, boiler horse-power and draft. Each boiler is also equipped with individual CO_2 recorders and thermocouple recording and indicating pyrometers of the smoke chart type.

Power Demands Are Constant

The boilers evaporate 14.21 pounds of water per pound of oil and cost of generating electric power is estimated at less than one cent per kilowatt hour. Power demands on the plant have been approximately constant but fuel costs have been reduced more than $5,000 per month.

The cost of developing the necessary power with the old plant which was displaced by the new one was about $13,000 per month. In January, 1923, it was $13,048.25; in February it was $14,234.82 and in March it was $15,792.17. During the corresponding months of 1924, the cost of power as developed by the new plant was $8,190.60, $6,219.00 and $6,575.90 respectively. Maintenance costs have been similarly reduced.

More efficient machinery is in part responsible for the savings effected. Power was generated in the old plant with non-condensing, reciprocating steam engines direct connected to electric generators.

Another important factor in effect-ing savings was the introduction of proper specifications and methods of testing fuel oil. Fuel oil having a specific gravity of 24.5 is insisted on and the oil is tested periodically to see that the quality is uniform and that it does not contain water or free carbon. The average cost of oil is 91 cents per barrel.

Labor costs have also been reduced as the old plant required four more men than are needed in the new plant. At present the total force for the three shifts is 16 men.

The flowmeters have disclosed wastes, particularly in the air lines. They have also shown that certain departments were not charged correctly for air, water and steam. The shop was previously charged with 59 per cent of the air compressing costs while 41 per cent was charged to the roundhouse and yards. The flowmeters disclosed the fact that the actual conditions were reversed; the shop using 39 per cent of the air.

Lubricant Consumption Reduced

The amount of oil used for lubrication has been reduced from 29 barrels to 3 barrels per month. For the most part this reduction is effected by machinery having bearings which use the oil efficiently and do not waste it. A part of it is accomplished by a water filter. After the oil in the turbine bearings has been used a certain length of time it is removed and run through the filter. The filtered oil makes a high grade lubricant for lathes, motors, line shafts, etc., in the shop and it is used for this purpose, the power plant being given credit for oil used in this way.

Additional fuel and labor savings will be effected as soon as three 250-hp. boilers now operating in the roundhouse can be shut down and steam piped from the new plant. A fuel saving of approximately $4,000 per month and a saving in operating costs of $500 per month will be made by this change.

Urges Distillate Users to Buy Early

"Oil burners for domestic heating are going in everywhere," said L. V. Nicholas, president of the National Petroleum Marketers' Association, in a confidential bulletin to the members of his association recently. "One cannot move around anywhere throughout the entire United States and not find new homes going up equipped with oil burners as part of the architect's specifications, and old houses putting them in as a modern improvement.

"In our opinion, the demand for distillates for domestic heating this fall and winter will be little short of an explosion. Distillate is as cheap now as it will be at any time this year, and we still earnestly urge our members who intend to sell distillate to set aside what storage they reasonably can and purchase now. This is a matter of service and protection to yourself and customers."

Want Fire Prevention Slogan

Prizes totaling $2,000 are offered by the Glen Falls Insurance Company, Glen Falls, N. Y., for the best fire prevention slogans submitted during Fire Prevention Week, which is from October 5 to 11 inclusive. The first prize is $500.

Practical Considerations in Oil Burning

Efficiencies at Different Rates with Different Combinations of Burners

(The Last of a Series of Six Articles)

By R. C. Brierly

IN order to meet various loads it is is necessary to run oil-burning installations at various powers. While changes in oil pressure may give satisfactory means of regulation for slight fluctuations, it is necessary to secure or light off burners to meet heavier variations, and with sustained loads constant operation of some burners is necessary while others are secured. The particular operating conditions of any plant determine the relative merits of different burner combinations. The load, draft, position of burners in regard to the heating surfaces, and other items constitute an equation peculiar to the individual plant.

Five Burners Mounted

Let us suppose that we have an installation consisting of five mechanical atomizing oil burners mounted on the furnace front of an express type boiler, and arranged as shown in the accompanying Figure 1.

At some particular rate it may be more efficient to operate the two upper burners, or the two wing burners. In our plant the wing burners may show a decided constant tendency to deposit carbon on the boiler tubes, necessitating the use of high excess air in order to prevent its formation. This excess air, of course, lowers efficiency, and under these circumstances, it would be better to operate the two upper burners. Some express types of boilers having broad combustion chambers might show a greater tendency to have carbon laid-down by the action of the upper burners, and under these circumstances, the operation of the wing burners would probably produce greater efficiency.

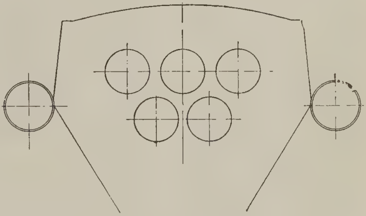


Figure 1

It may be impossible in a particular plant which has oil burners arranged per boiler in a manner similar to that shown in the above figure, to carry more than a draft sufficient to adequately support the combustion of three burners per boiler operating at capacity with the oil pressure at the burners 250 pounds per square inch gauge. Would it be more economical to operate five burners at less than maximum, or three at the above mentioned pressure? It is believed that, all of the conditions being equal, three at capacity would be the better operating condition, for the reason that greater fineness of atomization would be obtained. However, it has for years been an established fact, that, with certain types of boilers, too fine atomization is not desirable, owing to the fact that the combustible fails to burn all the way back in the furnace and very hot boiler fronts and cool backs may result with consequent loss of steam.

The relative efficiencies of different combinations of burners at various rates of steaming can only, like practically all other facts in oil burning, be ascertained by experimentation.

Registers of burners which are not being operated should be kept closed to prevent large quantities of excess air from gaining access to the furnace. However, in most installations, should the air control registers not in use be tightly shut they would become hot enough to be distorted; consequently, the best procedure is to permit a small amount of air to leak through them even at the expense of small efficiency losses.

One would almost think that the average oil burner man's sole amusement consists of quoting a number of "advantages of oil fuel" to anyone who will listen. Ordinarily these are worded very much alike and their effectiveness is lessened by their similarity and constant repetition; but the 20 advantages given here by Mr. Brierly include some unusual ones, all results of observation during his long oil burning experience.

There are five principal methods of producing the necessary draft for oil-burning installations:

(1) *Natural draft.* The current induced by the rising of heated gas and air through the stack produces natural draft. Good results may be obtained with oil while using this method, particularly with registers of large air capacity and low resistance.

(2) *Induced draft.* Air is sucked into the furnace and the gases of combustion expelled from the chimney by means of a blowing arrangement installed in the stack. Induced draft renders handling of the burners as facile as with natural draft, and is practicable because of the relatively low stack temperatures which are maintainable in oil burning. It is especially applicable for use with boilers in which the uptake gases make their exit at low temperature.

(3) *Closed fireroom.* Draft produced by forcing air into the tightly closed fireroom by means of forced-draft blowers. Closed fireroom is practically essential where maximum conditions are to be obtained.

(4) *The Howden System.* The burner registers are enclosed in an

(*Continued on page* 78)

HEATING THE HOME

Facts, Instead of Fancies, About Home Oil Heating

What it Costs to Heat a Home With Oil Compared With the Costs of Coal

By J. C. Hornung

THE object of this investigation was to determine: first, the capacity of the burner to heat our home comfortably in the coldest weather; second, the fitness of the burner to give continuous operation without undue care and adjustments; third, to determine the burner's ability to burn oil of varying gravity; fourth, to determine the burner's fitness from a safety standpoint, and fifth, to determine limitations of oil for automatic operation.

B. t. u. efficiency of the burner was not checked, as it is impossible to arrange a residence for a test of this kind, which would give any degree of accuracy.

The residence is two-story brick with full basement and has ten rooms including sunroom and sleeping porch, both being heated. The basement is also heated throughout except the cold-room. The location of residence is such that wind protection is limited to surrounding trees only.

The heating system is a standard low temperature two-pipe hot water gravity system, employing a 34 inch round boiler and cast-iron radiation, about two-thirds of which is window type. Based upon accepted formula, the radiation requirements for hot water heat are 1,208 square feet. The temperatures were automatically maintained at 72° from 5 a. m. until 10 p. m., and 66° from 10 p. m. until 5 a. m. No attempt was made to run an economy test by curtailing on ventilation. The burner used for warming the home is of the nozzle type, known as the Combustion Burner.

"I made this test," said Mr. Hornung, "partially to satisfy myself that oil heating as an industry had a future founded on intrinsic merit. The results convince me in the affirmative." Mr. Hornung has been identified actively with what he terms the "art of house heating" for twenty-five years, and has developed several controlling devices used in connection with central station heating and more recently for oil burning equipment.

The automatic regulation was that as manufactured by the Powers Regulator Company, which employs the Hornung "snap action" contacting devices. This regulation is composed of room thermostat, compound gas pilot, boiler control, and automatic relay switch as approved by the underwriters.

Complete Test Equipment

The test equipment included a separate electric meter installed on motor driven air pump; separate gas meter, installed on the pilot; measuring tank, installed on oil line so that oil consumption per hour could be measured accurately; mercury gauge, installed at the nozzle to determine the air pressure; special relief valve, installed so that constant air pressures could be maintained; twenty-four-hour time chart, attached to compressor to determine idle and operating hours; and a thermometer well, placed in oil and air lines at the nozzle to check and experiment on temperatures of both.

Oil was supplied to the service tank from a 1,000-gallon storage tank placed outside the basement wall. Readings were taken at 7 a. m. each day and extended from January 1, 1923, to May 1, 1923. The oils used ranged from fuel oil as low as 28 gravity to distilate running from 36 to 40 gravity. Co_2 readings were taken from time to time and carbon and soot conditions observed especially in connection with draft and air supply.

The mass of data accumulated during the four months of test cannot be presented in detail, but the summaries and conclusions are of interest. A word should be said here relative to the boiler and burner before presenting any of the findings. The burner was installed February 1, 1922, and was operated for nearly a year before the test began. During this time a number of changes were made in the setting and especially in the fire box. The flame travel was finally held at about 22 inches with the end impinging against a fire brick bridge wall set somewhat back of the center of the fire box. With proper adjustment of nozzle no carbon was deposited on bridge wall and no excess soot was accumulated in the upper passages.

Ash Is Efficiency Guide

The combustion chamber, or fire pot, became coated with a white ash—the non-combustible part of the fuel. Knowing that soot is never white, this was used as a sort of efficiency guide.

The drafts were carefully analyzed with CO_2 indicator and here rather interesting things happened. It was found that if the fire stream was directed fairly close to the bot-

(Continued on page 69.)

Chart I

(24 hr. chart)	16 hrs. 20 minutes.
Outside temperature—max.	8°
" " —min.	—3°
" " —mean.	2.3°
Inside temperature 69—70.	
Wind velocity max.	42 miles per hr.
Sky	fair—continued cold.

Three Variables in the Operation of the Industrial Burner

Fuel Temperature, Air Supply and Fuel Pressure are the Three Important Changeable Factors in Oil Burner Operation

By Keith J. Fanshier

THE proper temperature at which fuel oil is delivered to the burner tips in industrial oil burning has been the subject of considerable misapprehension. Recently a large concern which manufactures burners for industrial use and which maintains an extensive engineering department, made public the findings of a lengthy investigation on the subject, and upon other factors touching upon operating efficiency in oil burning. Excerpts of this report follow:

Any one of the three variables described by Mr. Fanshier may develop into a large obstruction in the road to efficient oil burning. And each of them may be successfully overcome if the owner or engineer in charge of operations will get the opinion of the burner manufacturer and combine it with his own in formulating a plan of attack. Conscientious teamwork invariably makes the solution easier.

The proper temperature for fuel oil reaching the burner is that temperature which reduces the viscosity of the oil to 8 degrees Engler, to 280 seconds Saybolt. In the past, it has been the custom for engineers to depend mostly upon the gravity of the oil used for determining its proper temperature. This has resulted in most cases in the improper operation of burners. Actually, gravity gives the engineer practically no information except as to weight. Basing operation on it alone can be only guesswork. Oils of the same gravity but of varying viscosities require temperatures to fit their particular qualifications.

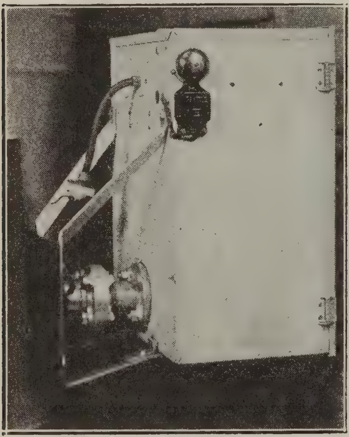
The engineer in the past has regarded experiment as a safe path in fixing oil temperatures; and, indeed, experiment is usually safe if it is on the right basis. It has been known for instance, that with too low an oil temperature, the oil would not atomize properly, and a heavily smoking burner would result. Contrary to general belief, no amount of excess air for the purpose of counteracting this will relieve the smoke. The only remedy is to increase the temperature of the oil.

In experimenting to reach the exact point at which a particular oil flows most efficiently (in keeping the pressure of the oil flow constant, and increasing the temperature) the point is reached where the greatest amount

(Continued on page 60)

Burner Allows Use of Other Fuels

Coal can be used for fuel just as readily as oil in the furnace in which this burner is installed, according to officials of the Electomatic Appliance Corporation, its manufacturers.



Unique New Burner

The motor, blower and all control apparatus are contained in the box which, as shown in the photograph, is attached to the fire box door. The bell, which is displayed so prominently on the side of the box, is sounded when for any reason, such as exhaustion of the oil supply, the burner ceases to operate.

Aladdin Official Optimistic

Charles H. Crooks, general manager of the Aladdin Oil Burner Corporation, Chicago, reports that the company is doing an increased business in placing domestic burners, particularly in Chicago and vicinity, and that he is quite optimistic over the outlook for his company and his industry in general for the coming year.

N. Y. U. Offers Courses In Fuel Oil Marketing

Courses in domestic and industrial consumption of oil for fuel will be offered by New York University during the fall term. They will be in charge of Dr. Ernest R. Lilley and will be limited to executives in the oil industry. According to Dr. Lilley, the course is designed primarily to assist the oil man in marketing his supply of cheap oils as fuel.

In addition to the discussion of oil consumption, such phases of oil marketing as its legal transportation and storage, foreign tariffs and rules, competition, and the development of the domestic oil burner will be studied.

Declares Oil Burners Supreme on Home Heating

Home heating supremacy will eventually become an attribute of oil burners, according to a pamphlet that has been sent out by Dooley and Braden Company, Rock Island, Ill., describing their Nu-Way Oil Burner. The Nu-Way is automatic and the motor, fan and control parts are enclosed in a cabinet which rests on collapsible standards. One of the unique features of the burner is said to be an entirely new ignition system, the principle of which is not revealed in the pamphlet.

Burning Oil in Malleable Non-Melting Furnaces

By G. V. Davidson

Four years of oil as a fuel under varying conditions in the furnaces of a Saginaw, Mich., malleable iron melting firm has demonstrated the superiority of oil to coal for such use to the officials of that company. This article is not presented to show that there are no difficulties in connection with the change to oil and its use in that industry. However, the test at Saginaw is rather conclusive of the good results which may be obtained as against results with coal.

OIL'S practical application as a fuel in malleable iron melting furnaces has been proved by the experience of the Saginaw Malleable Iron Company, Saginaw, Mich., which has used oil for more than four years.

The performance of oil in this industry may be judged by the statement of officials of the company to the effect that their use of it has been attended with entire satisfaction, and with improvement over the results obtained with coal, which was previously used.

Early in 1919 the company installed oil burning equipment, because of the fact that it was able to get coal only at what it considered an exorbitant price. Operation of the company's furnaces with coal had always been with indifferent success. This company's "heats" were large and difficult to melt satisfactorily. This has been overcome with fuel oil. The company reports the size of its "heats" now gives no trouble.

Officials of the Saginaw Company were won over to oil to such an extent that they substituted oil for hand firing with coal in their annealing ovens. They were satisfied with the result there also. Oil burners were first installed in the continuous tunnel type kilns.

The construction of the company's present oil fired furnace is the same as was used in coal firing. The combustion chamber was built over the old firebox, using sand and old firebrick to fill over the old grates. The inner walls of the furnace were built to form a V-shape chamber, eight feet long and about eighteen inches apart at the burner end. The burner was then placed in front of the combustion chamber, and inclined slightly toward the "bath."

The burners used on all the furnaces of this company were made by W. N. Best, Incorporated, New York City. Each furnace is equipped with one burner of the fan-tail type. Oil enters the burners through a three-fourths inch line at forty pounds pressure. It is cut off perpendicularly by a jet of compressed air in a half-inch line at eighty pounds pressure.

With a view to increasing the efficiency, steam for atomization has been tried several times, from thirty to seventy-five pounds pressure, but in every case it was unsuccessful. The time of melting was increased and there was greater oxidation loss in materials handled. Operation has now definitely settled upon air as an atomization agent, the air being admitted through a sixteenth-inch pipe under the burner at low pressure.

Oil Is Strained

The oil is pumped to the burners from a 16,000 and a 20,000 gallon tank, through a strainer, into a three-inch main line, then into a one and one-half inch line and subsequently to a three-fourths inch line. The temperature of the oil in the tanks is kept around 120 degrees Fahrenheit, and around 100 degrees at the burner. Because of the extremely low atmospheric temperatures encountered in this section, ample steam coils have been inserted in the tanks.

The oil consumption per ton of iron melted has been considerably lower than the former consumption of coal. A large number of afternoon heats have been melted on less than fifty gallons of oil per ton of iron, and in morning tests the heats have been repeatedly melted on sixty gallons. The heats run from sixteen to thirty-eight tons each, and it was found that different firing methods must be used on the small and the large heats. Oil firing was found more readily adjustable to these changing conditions than coal firing.

The labor used in melting iron with oil is quite low compared with the amount used in melting with coal. The company has worked out a system of paying its furnace firing workers on the basis of the amount of oil used per ton of iron melted. This gives the men an incentive to watch the fires closely and to cut consumption to the minimum.

Officials of the company say they think there is no question but that many malleable iron producers can change from hand firing to oil firing, with altogether satisfactory results, at a saving in cost to warrant the change. The principal improvements they have noted in changing from the one form to the other in their plant is the elimination of the human element, which naturally means an evener operation, and the better control possible of the time element.

Summing up the advantage in favor of oil burning, as this company has found them, they are: lower cost, ease of manipulation, decreased labor difficulties and possibility of melting large heats more satisfactorily.

Tulsa Schools Install Burners

At a recent meeting of the board of education of Tulsa, Okla., it was decided to install oil burners in the public schools, an architect's report having showed that a saving of from 25 to 50 per cent over the present heating costs would be made by such action. Natural gas has been used as fuel in Tulsa schools for the last few years.

Glimpses into the History of Oil Burning

By H. W. Werty

Occasionally we see a motor car of an early type and in comparing it with the ultra-modern cars we are impressed with the progress the automobile industry has made. But we seldom see types of the early oil burners, so the great strides made in the perfection of burning devices are hardly noticed. Compared with the crude machines of the nineteenth century many of the modern burners seem to be the ultimate in desirability. Yet the progress so far made is only a forecast of what is to follow in improvements and refinements.

OIL is known to have been burned for heating purposes, haphazardly, down through the ages, but it has only been in the last two generations that any progress has been made toward scientific oil burning. The best records available show that before the Civil War the burning of oil on a large scale was regarded as impracticable because in the past it had always been burned as a solid and the idea of attempting to burn the liquid had apparently not occured to anyone.

It was in Russia, a country generally acknowledged to be backward in many ways, that many of the first oil burning devices appeared. The existence of the heavy oil of the Caucasus region, ideal as fuel, materially helped Russian experimentation.

A mechanic named Werner, employed in a Russian refinery, is credited with having first suggested that refuse oil—or material corresponding to our modern heavy fuel oil—be burnt as fuel. In 1861, encouraged by his employers, he experimented with numerous devices and ultimately settled upon a contrivance consisting of a series of grates, or griddles, over which the oil trickled and burned. It was patented in 1867 and had a very wide use, considering that it was the pioneer in the field. The refuse oil was known to the Russians as "astatki" and existed in such large quantities that its disposal was a problem.

American inventive genius did not lag far behind, however, and in 1862 Shaw and Linton patented a furnace in which oil fuel was conveyed into the interior in a gaseous state, it having been previously heated and made to give off lighter oils, which subsequently were consumed in the furnace. A method used a trifle earlier consisted of a pan or step over which the oil flowed and was ignited.

In 1863 the first spray burner was

introduced in America by Brydges Adams. About the same time an "oozing" furnace was brought out in England by Richardson. The oil was fed to the interior after having traversed a bed of lime through which is was drawn by capillary action.

First Steam Atomization

A new era in oil burning dawned in 1865 when Aydon, Wise and Field introduced the first nozzle feeder in London. However, the honor of inventing the first really practical burner rests between Aydon and his associates and a Russian named Spakovsky, the latter using a blast of hot air to atomize the oil, whereas the Aydon device employed superheated steam. The Russian patented his device in 1865.

Around 1870 another Russian refiner perfected a burner which he hoped would help him find a market for his heavy refuse oil. It was crude compared with the modern burners but it served its purpose. He atomized the heavy oil by introducing it into a heavy tube through which a high pressure jet of steam was directed which, by its high velocity, broke the oil up into spray.

As late as 1878 another type of the oozing furnace was brought out in New Jersey, but by this time most of the more primitive types of burners had been abandoned in favor of the spray and the jet. The inventions and the reasoning of the pioneers in this style of oil burning were subjected to ridicule by their predecessors in many of the treatises written between 1890 and 1900.

Since 1883 the progress has been much more rapid and the number of different types of burners that have been introduced is very large. Each year has seen an improvement.

One of the early burners which attracted attention was designed by Baskakoff, a Russian, who introduced a stove for house warming with a soot formation of only .0003 per cent of the total amount of fuel used, and without the aid of atomization. This stove was awarded the gold medal of the Imperial Russian Technical Society. Thomas Urquhart, an American connected with the Russian railways, in 1884 perfected a method of spraying oil with steam and this was used as a pattern by other inventors for some years.

The Columbian Exposition at Chicago in 1893 gave great impetus to the use of liquid fuel in America. All boilers there were arranged with fuel oil only.

Engineers Guide Discusses Oil Burning

One very good chapter on "Oil Fuel for Industrial and Domestic Heating" is contained in the American Society of Heating and Ventilating Engineers Guide for 1924-25. It gives a general review of the whole oil burning situation, including a description and analysis of fuel oil and its many uses, and the history and development of both industrial and domestic oil burning equipment. Byron K. Eaton, of the Winslow Boiler and Engineering Works, Chicago, and A. H. Ballard, of the Ballard Heat Equipment Company, New York, furnished the material for the chapter.

service

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FUEL OIL MARKETS

Fuel Oil and Distillates at High Levels

RESPONDING to the seasonal operation of the law of supply and demand, the prices of fuel oil in the past forty-five days have advanced from the low to the high point of the year, with a dollar a barrel commonly asked in the open market for 24-26 gravity fuel oil. Heavy demand from many industries have caused this advance. Firmness continues at this level in spite of declines in crude oil prices. Gas oil and the lighter distillates have followed the price increase in fuel oils.

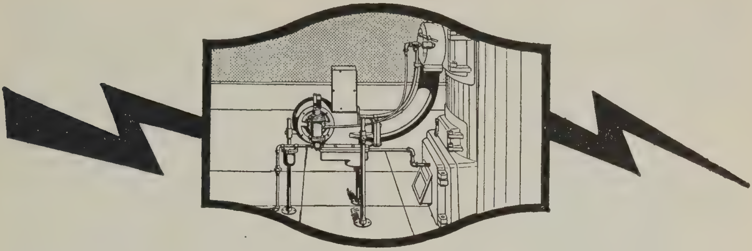
Has Been Seller's Market

The fuel oil market for the last thirty days has been decidedly a seller's market, with some refiners offering little or none at any price. Numbers of the quantity users of fuel oil in the large industries are taking amounts under contract for sixty to seventy-five cents. Others without the favorable contracts are buying most sparingly in the present stiff market, disliking long-time commitments at present market prices. They argue for a drop in the market in view of recent crude cuts, which bring the price of crude to a point where in some cases a refiner can get more for fuel oil than his crude costs him.

Refinery stocks of burning oil are light. This is due partly to the continued disposition of refiners throughout the summer to crack distillates into gasoline in spite of receding motor fuel markets. The almost unparalleled coolness of the past summer and the belief of many that a long, severe winter may follow is helping strengthen the lighter burning oils. This is heightened by the fact that tens of thousands of domestic oil burners are in heating plants which were not there at this time in 1923. A sustaining force for light distillates is the fact that some industrial plants using fuel oil in the spring and summer invariably switch to lighter fuel with the approach of winter. Kerosene has been firm for weeks. This is largely but not solely due to its demand as a residential burner fuel.

Prompt Shipment Rare

Most of the orders for heavy fuel oil are running below fifty cars. It is hard to get prompt shipment on nearly all grades. Refiners are in no mood to consider lagging bids, claiming they have all the business they can handle on contract or at top market prices. Among those benefiting from previous contracts in con-



The Truth About Electric Ignition

Electric spark plug ignition of oil for heating purposes was successfully achieved more than 15 years ago.

In June 1919, this principle was first applied to domestic oil burners. Its practicability was demonstrated in the winter which followed.

The development of electric ignition for oil heaters was carried out by the engineers who designed the Electrol Automatic Oil Burner. When false or misleading claims are made that electric ignition in oil burners has now been perfected or developed for the first time by any one, this can be characterized in only one way.

Yet these claims are natural enough. The price of pioneering is always imitation. The penalty of leadership is always the envy of those who only follow.

When false claims are made in advertising (as they have been made concerning the development of electric ignition for oil burners), we must remind you that "truth in advertising means honesty in product."

HOME APPLIANCE CORPORATION
2818 Locust Blvd. St. Louis, Mo.

The Electrol Automatic Oil Burner is the perfected oil burner with the added essential feature of entirely automatic electric ignition. Some desirable territory is still available. Write for particulars.

(Scott-Newcomb System)

ELECTROL

Electric Ignition Quiet Operation

AUTOMATIC OIL BURNER

Emerson Motors

Single Phase, Poly Phase and D. C.
(Interchangeable)

2508

2 H. p.
and
Smaller

For thirty years we have specialized in producing motors in these sizes

The Emerson Electric Mfg. Co.

2018 Washington Ave., St. Louis, Mo.
50 Church St., New York City

(We sell no motors at retail or to the user)

NATIONAL AIROIL BURNER

Airoil Burners

"are efficient"

The Complete Design and Installation of Oil Burning Systems

National Airoil Burner Co.
916 Thompson Street
Philadelphia

trast with the advancing market are several railroads, some of which are taking oil on contract for slightly above sixty cents.

The number of buyers in the market for furnace oil is larger this year than last. Quite a number of jobbers are handling it this fall for the first time, after having been convinced of the merit, stability and popularity of the domestic burner. The Standard Oil Company of Indiana this year is supplying a furnace oil for domestic burner use in only one grade, which it does not sell on gravity specification, but which is generally believed to run near 34 to 36 degrees Baume.

There are two exactly opposed ideas on the predicted behavior of the fuel oil market for the next month. Some believe the present strength is an inflated one and that prices will decline shortly. Others think the market will at least hold steady and may advance. The majority of authoritative market opinions seems to be that the market will at least hold steady for several weeks. Without guaranteeing a later decline, such a thing might be possible in view of the weakness in the crude markets, but this may to a large extent be offset by the increased use of oil fuels.

Current Tank Car Prices

The following prices in tank car lots, f.o.b. Group Three refineries or adjusted to that basis, were quoted as of Sept. 23, shipment in sellers' tanks:

Fuel oil, 24-26 gravity, low sulphur, bbl....	$.95	$1.00

Every Installation Needs a Gauge

PNEUMERCATOR CO. INC. BROOKLYN, N.Y.
TYPE H.T.I. TANK GAUGE PAT. MAR. 9 1915
FT

To check deliveries, to show how much and how fast oil is being used, and to show stock on hand. And that gauge—to be worth while—must be simple, convenient and, above all, accurate. Here it is—

Pneumercator Oil Tank Gauge

Place it where you will—at the tank or in your office—and it tells the whole story of conditions in the tank, moment by moment. It's the watch-dog on your fuel supply—it pays for itself in the loss and waste it prevents.

Model "HTI" is illustrated, for residence storage tanks not exceeding 6 feet in depth. Price $25.00. Dealers' Discounts on Request.

Other models are made, for larger tanks. And the Underwriters' Laboratories have approved them all. Let us tell you more about them.

Pneumercator Company, Inc.
Sperry Building, Brooklyn, N. Y.

Fuel oil, 26-28 gravity, low sulphur, bbl....	1.00	1.05
Fuel oil, Smackover..	.90	.95
Gas oil, 32-36 gravity, gal.	.02⅞	.03
Distillate, 36-38 gravity, gal.	.03¼	
Distillate, 38-40 gravity, gal.	.03⅞	.04
Kerosene, 41-43 gravity, gal.	.04⅞	.05
Kerosene, 42-44 gravity, gal.	.05	.05⅛

Gas and Fuel Oil Production Decreases Slightly

Production of gas and fuel oils amounted to 1,102,785,843 gallons during the month of July, a daily average of 35,573,737 gallons. This represents a decrease of 3.6 per cent from the daily average reached in June. Stocks on hand September 1 were 1,603,643,206 gallons, a decrease of 14,920,323 gallons from August 1. Domestic demand amounted to approximately 1,001,000,000 gallons, exact figures not being available at this writing. This represents an increase of about 5 per cent over June.

Burner Firm Issues a Warning to Wives

"Why Rich Men Marry A Second Time" is the title of a booklet issued by the Simplex Manufacturing Company, Chicago, manufacturers of the Sun-Burst oil burner. Cleverly written "brutal truths" are presented to show that the ordinary self-made rich man literally wears out one wife by making her help him attain success. Then, according to the booklet, she dies and he marries again.

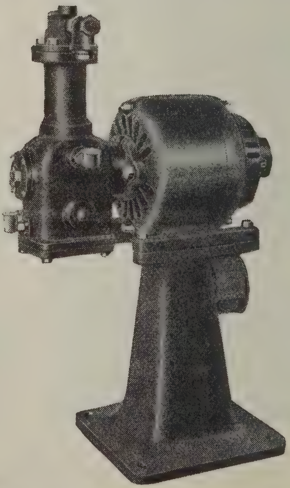
The moral, of course, is to install an oil burner and save the first wife.

Insures Fuel As Required

Entirely Automatic, No Priming Necessary At Any Time, Easily Installed, Noiseless, Low Cost Operation

Write for Bulletin "H"

Monroe Machine Tool Company
737 W. Jackson Blvd.
CHICAGO



Comprehensive service

—in oil burning equipment
—in combustion engineering
—in combustion specialties

BEFORE the first Simplex Burner for power plants was offered for sale, thousands of dollars were spent in exhaustive experimenting and service tests. The result is a high grade mechanical oil burner with the following practical advantages: 1) a short, bushy flame, insuring a maximum of CO_2 gas at all times, without smoke; 2) low air and oil pressure; 3) complete combustion; 4) low stack temperatures; 5) high and constant CO_2 readings; 6) high boiler efficiency; 7) low cost of installation; 8) low cost of maintenance; 9) coolness of boiler room; 10) simplicity of operation.

The Simplex Air Control Cone eliminates all burner cones, diffusers, impellers, etc., and is adjustable to a fraction of an inch to take care of varying loads. The burner is the simplest on the market. It consists of only two parts. It has exceptionally long life, will atomize under 40 pounds pressure and is easily cleaned.

The simplicity of the Simplex Burner makes it possible for any ordinary fireman to get maximum results. Moreover, a saving in oil consumption has been achieved—amounting to from 10% to 15% over any other burner with which the designers have had experience.

Domestic Burners

The Schulse-Simplex Oil Burner for homes requires no motor or blower—no gas pilot. The burner is reasonably priced—which means an enormous market.

By our patented method, the air is delivered at right angles to the delivery of the oil. This insures complete vaporization and perfect combustion. The Schulse burns without smoke, soot or carbon; there are no clogged or dirty pipes even at the end of winter.

This burner can be installed in half a day. Owing to its remarkable simplicity, the requests for service are few.

Certain territories are still open to exclusive dealers—for whom we have an exceedingly attractive proposition.

Engineering Service

The Simplex Company also renders the following services:

1 Designing and installation of power plants or any part of them.

2 Furnace brickwork of every description.

3 We carry a full line of Draft Gauges, CO_2 Indicators, Electric Pyrometers, Steam Flow Meters, Flexible Oil Hose Connections, and all combustion accessories.

The SIMPLEX FUEL OIL ENGINEERING CO. Inc.

11 BROADWAY ◦ ◦ NEW YORK

Gill Dealers Have Meeting

At a conference of all the Gill Oil Burner Company's dealers in eastern cities, between Richmond, Va., and Boston, Mass., held in New York City recently, it was decided to hold meetings quarterly. The next one will be held in New York City in November.

Berkins Company Issues Burner Folder

There are only four parts assembled in the Berkins Burner, which is manufactured by the Berkins Oil Burner Company, Chicago, according to a circular recently issued by that company. The gravity system of fuel supply is used and a large U-shaped tube is employed to conduct a current of air to the combustion plate in such manner that it is discharged downward on the plate and causes the flame to spread out. The air current is supplied by use of the same principle that is used in supplying draft for a fire-place.

Bethlehem-Dahl Makes Large Installations

Bethlehem-Dahl heating units and Bethlehem pumps have been installed in the General Electric plants at Bloomfield, N. J., and Philadelphia, Pa., by the Bethlehem Shipbuilding Corporation. Babcock & Wilcox boilers and burners were included in the units. Complete Bethlehem installations have been made in the Consolidated Products Company and John E. Bastien Grain Company plants, Chicago, Ill.

Big rewards await you

in the oil burner field if you are energetic. We want men of ability as distributors for the

Warner Oil Burner

The *Warner's* new and tested exclusive advantages will make selling easy.

THE WARNER is a gravity feed oil burner which is *practically noiseless.* Its natural draft simple construction makes it wonderfully efficient. Its economy of operation rivals only a low initial cost that makes them sell readily. The oil Burner field is still in its infancy, so the opportunity for success is not restricted. Small capital, the will to win, and intelligence is all you need.

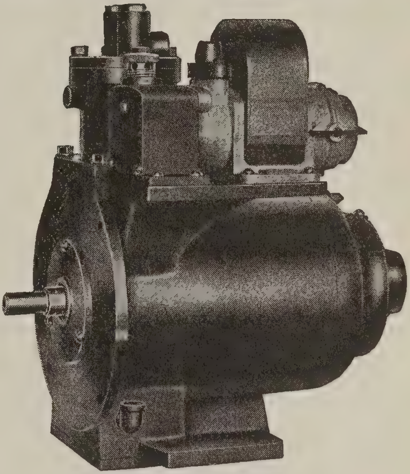
Write for particulars to

L. F. Warner Manufacturing Co.
New London, Conn.

More Than a Motor

Assurance

Manufacturers who are using Janette Special Motors are convinced that their unusual long life and superior quality, not only increases sales and profits, but are accepted by consumers at large as "Fool Proof," and dependable motors.



Janette Special Design Motor for one of the Popular Oil Burners

Our Engineering Department cordially invites you to submit your problems and requests for advice without obligation on your part.

Janette Manufacturing Company
556-558 West Monroe Street
Chicago

PHILADELPHIA
439 REAL ESTATE
TRUST BUILDING

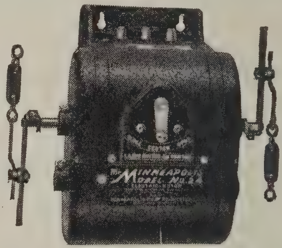
NEW YORK
SINGER BUILDING
149 BROADWAY

Janette Motors

Two New Minneapolis Models Are Announced

Announcement of two new models has been made by the Minneapolis Heat Regulator Company, Minneapolis, Minn. They are the Model 77, 8-day thermostat and the Model 24 A.C. Electric Motor. The former consists of a stack thermostat located in the stack or smoke pipe with a special cut-out mechanism with a timing device attached that permits sufficient time for ignition to take place. Should the burner fail to ignite, operation will be stopped by a circuit breaker in the thermostat, according to the company's announcement, and if the burner, during operation, is extinguished from any cause whatsoever, such as the oil supply being exhausted, the circuit breaker again acts to prevent further useless or damaging operation of the motor.

The motor, which is entirely covered by simply designed aluminum housing, is used with a small transformer that prevents it from using current when not in operation, Minneapolis officials claim.

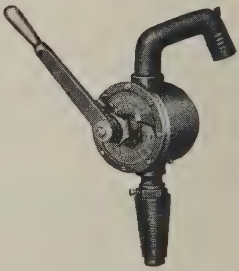


The new Model 24 A. C. Electric Motor for oil burners which has been announced by the Minneapolis Heat Regulator Company.

To Oil Burner Manufacturers and Dealers:

The Force Pump delivers from 12-15 gallons per minute with the slightest pressure on the handle. No strength is necessary to operate it. It sometimes happens in emergencies that wife or child may have to take care of filling supply tank in basement. Either one can do it in just one-half a minute without undue effort, by using the Force Pump, the pump of long life and satisfaction.

Allow us to send you one for demonstrating purposes.



FORCE PUMP COMPANY

1821 Berteau Avenue CHICAGO, ILLINOIS

Name...................... Adderss...................................

....

Oil Burner Castings

IRON AND BRASS **UNFINISHED OR MACHINED**

Various parts of oil burners require different qualities of iron for their particular use. Some require close grained leak proof or heat resisting qualities; some require soft iron for a large amount of machine work; some can be rough castings where finish is of no particular importance.

Our five foundries and machine shop insure you of our ability to take care of your requirements in every respect.

Chicago Hardware Foundry Co.

North Chicago, Illinois

THE BASEL TYPE E-3 HEAT REGULATOR

is now equipped complete, with Thermostat, magnetic control, mercoid switch for operating motor, valve, automatic cut-off, of both oil and motor from overflow of oil to trip bucket, Thermostat control and automatic cut-off each being independent of the other.

Hand control independent of either the Thermostatic control or automatic cut-off.

Removable strainer, air seal, enclosed in steel case.

In fact everything in a nut shell. What more do you want? For Mechanical or Gravity Feed burners.

Basel line of valves and heat regulators are made in seven types. Two of which are approved and listed as standard by the Underwriters Laboratories of the National Board of Fire Underwriters.

All frictionless and packingless.

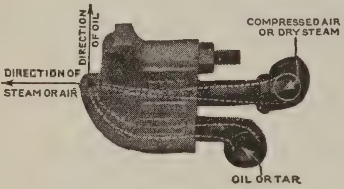
The Basel line of valves and heat regulators are not just ordinary valves. They mean advanced theories in Heat Regulators and Valves and Valve control construction.

Valves and valve control is our hobby. Literature on request.

911 Mulberry St. **BASEL MANUFACTURING COMPANY** Kansas City, Mo.

W. N. BEST

Oil Burners



The BEST since 1890

W. N. BEST Corporation
11 Broadway New York City

WE SPECIALIZE
IN
FUEL OILS
GAS OILS
FOR DOMESTIC OR
INDUSTRIAL PLANTS

DELIVERED EITHER IN
TANK TRUCKS OR
TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

OHIO REFINING COMPANY
TELEPHONE RIDGE 884
CINCINNATI, OHIO

Used Crushed Firebrick as Refractory Material

Crushed firebrick forms the refractory material used by the Rayfield burner, according to a folder published by the Rayfield Manufacturing Company, Chicago, recently. The grates in the furnace are removed and the lower portion is filled with the crushed material and the flame from the burner is directed down upon it. The Rayfield nozzle is unique in that it points almost straight down, an unusual practise.

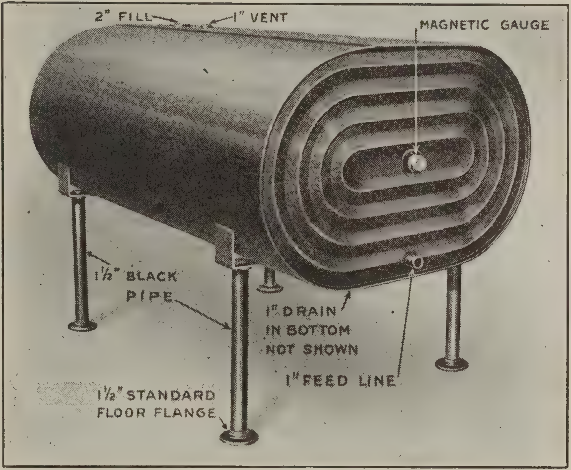
Advise Burner Owners to Buy Early

Numerous burner companies are joining the fuel oil supply companies in local communities in requesting the users of domestic oil burners to fill their tanks early this year. They point out that the prices generally are at a level where they may not be expected to go lower, and that the expected cool fall and possible early winter may bring about a somewhat conjested condition in supplying oil to customers.

According to an announcement by G. H. Rittenhouse, director of sales for the Pennsylvania Globe Rotary Oil Burner Company, Philadelphia, the Globe Rotary Burner has recently been added to the Underwriters' Laboratory's list of approved burners.

R. G. Ewell, formerly advertising manager for the Wayne Tank and Pump Company, Fort Wayne, Ind., has been appointed manager of sales for Wayne Water Softeners and the new Wayne Oil Burners.

GENWELD OBROUND INSIDE FUEL OIL STORAGE TANK



For Domestic Oil Burner Use

THREE SIZES
200 Gals Length 48"
245 Gals Length 60"
275 Gals Length 67"
Width 42"
Depth 26"

Now in Use in Twenty-four States East of the Rocky Mountains

Send for complete description and price

GENERAL WELDING PRODUCTS, Inc.
5027 McKissock Ave. St. Louis, Mo.

Be Your Own Judge Of Our Oil Resources

By Arthur G. Winkler

"DON'T be foolish enough to install an oil burner," entreats the coal dealer. "Don't you know that in two or three years all our oil resources will be exhausted and you'll be without fuel?"

"Gas is the thing," says the public utilities man. "Tomorrow you may not have any oil, but you're always sure of plenty of gas."

And it is all groundless propaganda.

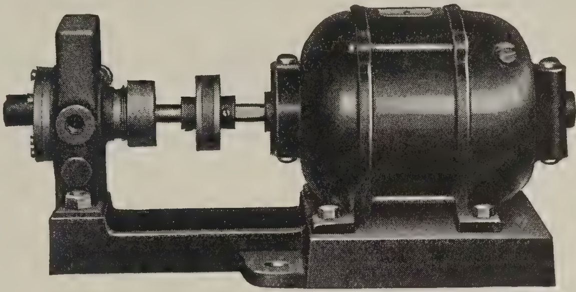
Chance enters into the production of oil just as it enters into the production of grain, or steel, and no more. Alarmists, however, seeking publicity, give the world their opinions — not facts — which are seized upon by opponents of oil burning to flaunt in the face of the prospective burner owner.

The self-appointed prophet who attempts to predict the life of our oil resources is ridiculous, whether he places it at 10 years or 100. Within the last ten months, more than 25 men, ranging from congressmen to college professors, have broken into the headlines with predictions of from 10 months to 700 years. Even our great geologists are at variance.

To be fair in questions of this kind is to present cold facts, free from personal opinion, and let the reader judge for himself.

During the last session of Congress a member vividly described how the Navy was wasting our small store of oil by burning it in battleships, and asked for legislation requiring the Navy to use coal. His statements caused some apprehension. But the public overlooked the fact that he knew nothing whatever about our oil resources, for his statements were ridiculously untrue, and also overlooked the very significant fact that he was a representative from West Virginia, a coal producing state which needed another market for some of its coal!

In 1859, the first year oil was produced in the United States, 2,000 barrels of crude, of 42 gallons each, was the output. By 1900 this had risen to 63,620,529 barrels yearly. In 1923 the total was 725,702,000 barrels. Of this total, approximately 35 per cent was used as gas and fuel oil, according to the statistics of the American Petroleum Institute. In 1859 only one per cent was used for this purpose; in 1920 approximately 33 per cent, and in 1915, about 31 per cent. The production of crude has increased steadily and the percentage of it used for fuel has increased about the same, at least for the last 10 years.



"Announcing"

The "Paul Type RRO" Revolving Reciprocating Oil Pump

This pump is designed to meet the particular requirements of oil burner installations in the best possible way. Although very small in size and capacity it has all the desirable features found in large pumps and in addition several characteristics found in no other pump.

The revolving reciprocating piston is double acting and has no clearance, producing a powerful suction.

The three moving parts are absolutely balanced and cause no vibration at any speed.

Although no valves are used, the action is positive and independent of the speed.

The pump is absolutely noiseless in operation and produces uniform flow of oil.

The pump has no internal packing or other parts requiring attention or renewal.

When direct connected to an electric motor at 1750 r.p.m. the No. 134 RRO pump has a capacity of one gallon per minute.

For full information and prices ask for Bulletin No. 5030.

FORT WAYNE ENGINEERING & MANUFACTURING CO.

Home Office and Factory

FORT WAYNE, INDIANA

Branch Office in Principal Cities

It will likely continue to increase, for refiners are constantly experimenting with new distilling processes that give more of the highly volatile products from smaller portions of the crude, leaving larger percentages for use as burning oils. Improvements in motors have made it possible for a given amount of fuel to do much more work than previously, so the demand for gasoline will probably not increase any more swiftly than the demand for fuel oil. Hence, neither will have to be produced at the expense of the other.

Seven U. S. Producing Regions

At present there are in the United States seven oil producing districts, each including numerous fields. The oldest district is the Appalachian, development of which began in 1859. Last year it produced 28,000,000 barrels of crude. Its peak is acknowledged to have passed, the largest production being 36,000,000 barrels, which it produced in 1900.

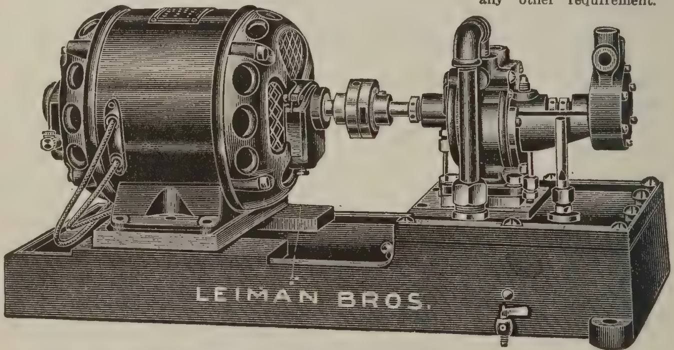
Lima-Indiana Declining

The Lima-Indiana district, the smallest of the seven, was first drilled in 1870. Its production in 1923 was but 2,413,000 barrels, for its peak was passed in 1896, when it produced 25,000,000 barrels. The Illinois district, the next largest, last year produced 9,502,000 barrels. Development was begun in 1904 and the peak was passed in 1910, with an output of 33,143,000 barrels.

The Mid-Continent, the largest of the districts, was begun in 1904. Last year production was 343,928,000 and

The Reliable Oil and Air Pumping Unit for Fuel Oil Burners That Makes Oil Heating Popular

Size suitable for Homes, Apartments, Hotels, Institutions, Factories, Greenhouses, Office buildings or any other requirement.


LEIMAN BROS.

For atmoizing at low pressures
7 sizes, Prompt Deliveries
Proper atomization—Intense Heat—Simple Construction.

NOISELESS

Self-Lubricating
Wear Compensating

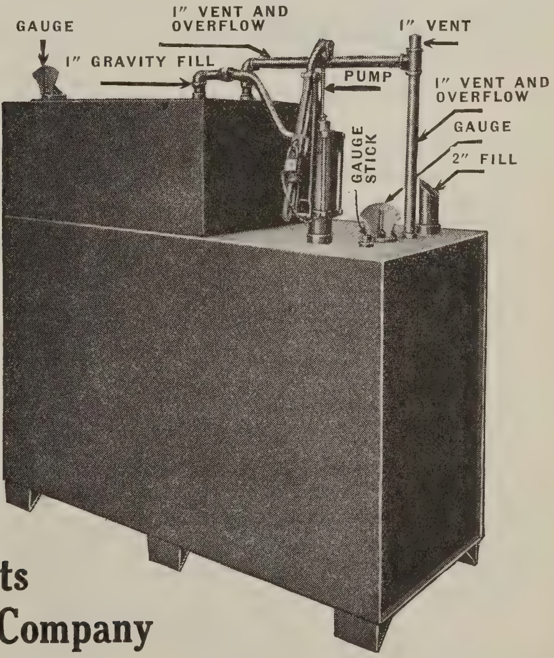
LEIMAN BROS. 60 LISPENARD STREET
NEW YORK

35 Years Experience

A Square Deal In Square Tanks

This 274 gallon unit is the utmost for utility. It passes through a 2 foot door, economizing space, fitting into corners or against the wall. Sturdy inside braces reinforce large tank preventing bulging. The entire unit is beautifully finished in baked green enamel. Capacity: Storage tank, 219 gals., Gravity tank, 55 gals., a total capacity one gallon less than allowable limit in certain restricted areas. Meets underwriters' requirements.

MANUFACTURERS AND DEALERS: If you appreciate quality, utility, design and beauty, *why pay more for common tanks?* Ask for Bulletin F-1.



LIST PRICE

F. O. B. CARS
MAYWOOD

$78.00

Oil Products Appliance Company

Maywood, Ill.

"WHAT USERS SAY OF THEIR HUBBARD BURNERS"

HUBBARD OIL BURNER

Write for this Literature

Some Good Dealer Territory Open

HUBBARD AUTOMATIC OIL BURNER CORPORATION
MANUFACTURERS OF
Oil Burning Equipment

724 Second Avenue, Sq. Minneapolis, Minn.

YOUR CONTROL PROBLEMS

Solved by

CON-TAC-TOR Mercury Controls

Dependable, Long - Lived, Eliminate Contact Troubles and Service Calls.

High and Low Voltage Room Thermo Switches, Boiler Safeties, Time Limit Switches, Magnetic Valves, etc. A complete Automatic Line.

ABSOLUTE CON-TAC-TOR CORPORATION
BELOIT, WISCONSIN

it is still on the increase. The Rocky Mountain District, also still on the increase, was begun in 1903 and last year produced 47,000,000 barrels. The Gulf Coast district started to produce in 1904, last year had an output of 35,3688,000 barrels and is still rising. The California district started in 1894, is still increasing its output and last year produced 264,000,000 barrels.

Thus we see that the 75-year-old district is producing 78 per cent as much oil as it did during its peak year. The smallest district is giving but 10 per cent 28 years after birth, and the next largest 28 per cent at the age of 20 years. The four larger districts are still rising and if we take an average of the life of the other three, and apply the same proportion, the peak of each of these four should be reached in from 10 to 30 years from now. But this is only supposition, for we cannot judge the life of one field by the life of another, although the larger the field, the longer it seems to hold up.

Seven Promising Districts

Besides the seven producing districts, there are seven promising, undeveloped areas in the United States today, each of which may develop into producing districts as large as any we now have. They are located in the following states: Utah, Montana (slightly developed), New Mexico (slightly developed), Louisiana, Colorado, Texas and California. Each is on the outskirts of one of the original districts, which could be widened to include it, but

BOWSER ESTABLISHED 1885

It's Cheaper to *Use* a Bowser Tank Than Just to *Pay* for it

Here's the point. Bowser tank equipment safeguards oils, makes sure that you have no waste or leakage.

A poorly made tank costs only a little less than a genuine Bowser, is likely to leak, and waste your money. Thus, it is actually cheaper to buy a genuine Bowser in the first place, and never have any losses.

Our circular "*Tankology*" outlines the facts. For your copy, please address Dept. 9.

S.F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters
FORT WAYNE, INDIANA.
Sales and Service Offices and Representatives Everywhere

reports indicate that the source of supply in each case is independent of the larger district.

North American Areas

Many other promising areas are to be found on the North American continent. Alaska has no production at present, but oil has been discovered in four widely separated spots. Canada has three semi-developed districts and one in which oil has been discovered, but no development undertaken. There are three producing areas in Mexico and three where oil has been discovered. Central America has but one producing area, but discoveries have given promise of six more. In the extreme northern countries of South America there are four producing areas and 15 promising, undeveloped ones. From all these countries named, transportation of oil to the United States is a feasible process. It is obvious, also, that there are other portions of the continent, including the United States, in which oil may still be discovered.

Shale a Future Source

Another future source is shale, from which is distilled oil that makes one of the best fuels. And the source is one that will take a very long time to deplete, for oil bearing shale is found in more than half the states in the Union. Tests recently made on Colorado shale proved its oil content to be from one and one-half to four barrels of oil per ton. Shale distillation is an expensive process as yet, but will American inventive genius stop before a cheap

BRASS PIPE AND TUBE FITTINGS

We offer you a dependable source of supply for the purchase of brass fittings for oil burning equipment. Our facilities for quantity production enable us to quote attractive prices and insure fittings of a high, uniform quality. We are able to fill your orders without confusion or delay.

Send a sample or blue-print for estimates on special fittings made to your own specifications.

COMMONWEALTH BRASS CORPORATION
COMMONWEALTH AVE. & G. T. RY. DETROIT

For Home Heating

Roaring Burners Are Obsolete Today

Home Owners Will Know It Tomorrow

HEAVY oils are now burned *silently* in a clear, carbonless flame that clings close to the furnace walls and is held low so that the heat is not lost in the chimney. The improved "Gun and Target" atomizing of the *Sword Automatic Oil Burner* is responsble for the clean flame and a revolutionary way of feeding air to the burner eliminates the noise and reduces chimney losses at least 50%. Thousands of additional home owners are being converted to the burning of oil and the roaring type of burner has become obsolete.

PROGRESSIVE DEALERS ARE ACTING NOW!

The advantages to the dealer handling the *"Sword"* are twofold: in direct competition he can outclass any burner on the market; and he can interest exacting buyers who insist on silence and demand a substantial saving over the cost of burning coal. Dealers everywhere are acting now.

Write for Full Information

Sword & Kimber Company
4861 Stenten Avenue
PHILADELPHIA, PA.

refining process is found? Likely not, judging by past examples.

Besides the billions of tons of shale there are immense deposits of lignite and other poor combustion coals from which oil can be distilled Texas alone has 30,000,000 tons of lignite that will yield an average of three-fourths of a barrel of oil a ton.

Stocks High for Three Years

For the last three years the stocks of gas and fuel on hand at refineries has been maintained at a quantity large enough for more than 60 days' supply for the nation, so that in the event of a complete shut down of production the nation would be supplied for about two months from the stocks on hand.

Summarizing, we have the follow-

Oil Valves

Automatic Safety Trip Valves
Thermostatic Valves
Needle Valves
Needlevalve Drain Cocks

Acme Brass & Machine Works
609-611 East 17th St.
Kansas City, Mo.

TANKS
For Fuel Oil

Capacities 260 to 10,000 gallons

Popular sizes carried in stock

The Boardman Co.
Oklahoma City

Write for Catalog and Prices

Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers". It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York

Branch Offices in the Larger Cities

NIAGARA OIL METERS

Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.
2926 Main St.
Buffalo, New York

Improved Rotary Type 22

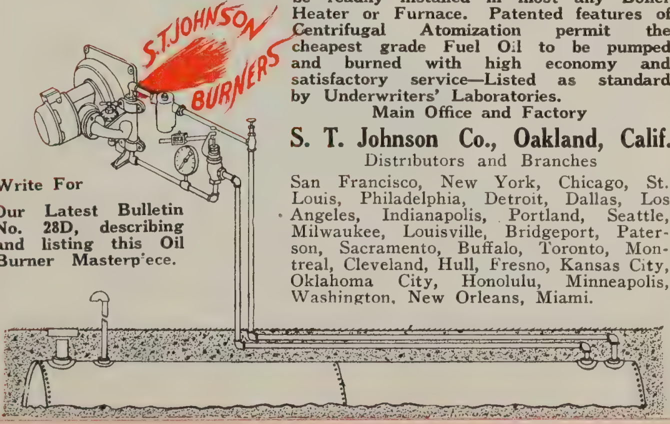
This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—And Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

Main Office and Factory

S. T. Johnson Co., Oakland, Calif.

Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Paterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.



Write For

Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.

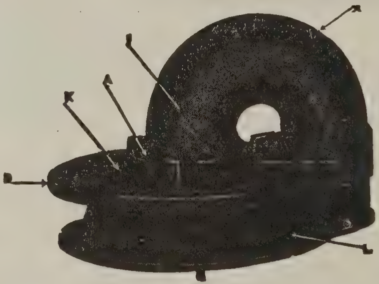
ing facts on which to base our opinions: fourteen producing areas on the continent of North America, three of them receding and the remainder increasing with their peaks apparently years in the future; 21 promising, undeveloped areas in which oil has been discovered; deposits of shale and lignite, both sources of oil, of sizes that we can only guess, knowing, however, that they are immense; and the entire oil industry working toward more efficient utilization of smaller percentages of the volatile elements of the crude, thus leaving more and more each year to be used as burning oil.

Standard Makes Changes

Some changes in its furnace burner have been announced by the Standard Oil Burner Company, St. Louis, Mo., the design having been altered so the direction and length of the flame travel are changed and increased, giving better mixing of the oil and air, and improving the combustion, according to the announcement.

Diesel Electric Tug Is Successful

Proof of her prowess, in actual service, is being given by the Pennsylvania Railroad's Tug No. 16, the first Diesel Electric tug ever built. She is being used in New York Harbor and exhibits quietness, smoothness of operation and maneuvering, and the ability to develop full towing power much better than the ordinary steam tugs.



The White Flame

Liberty Oil Burner

Throws the Flame out against the side of the Fire Box

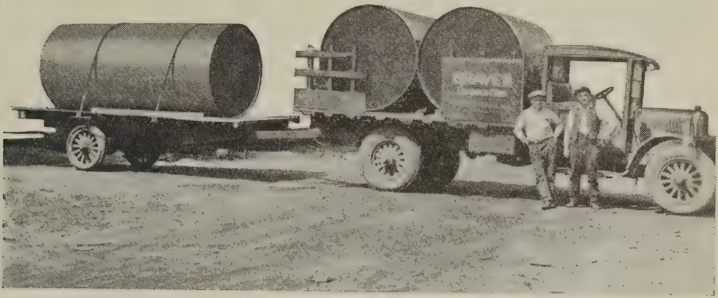
The **Liberty Burner** is **Made Right** to **Heat Right—Quiet** in operation. **No Soot** or **Carbon** to cause Servicing after installation of Burner.
Thousands of Satisfied Users.

Successfully operated by Thermostatic Connections

Sold only through reliable Dealers and Distributors, at very Liberal Discounts.
Write for Exclusive territory. "Years in Successful Use."

Liberty Oil Burner Co., Inc.

Leavenworth at 16th St., **Omaha, Neb.**



Protect your oil with a Graver Tank

You will find, in either the Graver Welded or Riveted Tank, absolute protection for your oil stored either underground or above ground.

Graver electric lap welding gives you a tank that will stay tight, and whose joints are as strong as the steel itself. Welded tanks are made in all standard sizes from 550 to 4,000 gallons.

For larger storage either the Riveted and Caulked or the RIOW (welded and riveted) tank will give you the protection which you need and should demand in a tank. Made in standardized sizes from 4,000 to 30,000 gallons.

Prompt shipment can be made on any standard size—with exceptionally attractive prices on quantity lots. Write for prices.

GRAVER *Corporation*

(WM. GRAVER TANK WORKS · FOUNDED 1857)

Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment

160 Todd Avenue, East Chicago, Ind.

New York Chicago Tulsa Houston

Liked Home Heating Number

CHALMERS OIL BURNER CO.
Minneapolis, Minn.

Editor, **Fuel Oil:**

I have looked over the September number of **Fuel Oil** and I want to say frankly that I think you are entitled to a lot of credit for this magnificent number. I am always anxious to help the industry as well as help my own business. I feel that every time I do something for the industry as a whole I am doing something for the public welfare and for my own good as well. I think the same thing is true of your business. This magnificent number is a real contribution to the industry and should help the good work along and at the same time I think you can rest with absolute assurance on this proposition, viz., that **Fuel Oil** is the world's leading publication on the subject of oil burners and most matters connected therewith.

Yours truly,
C. H. CHALMERS.

New Folder By Kerrihard Company

A complete explanation of the operation and development of the Kerrihard burner is given in a booklet recently issued by the Kerrihard Company, Red Oak, Iowa. Detailed drawings and photographs of different types of installations, with correct radiator and piping arrangement for each, are given. The Kerrihard is a gravity feed burner, and according to the booklet, has a dual control that regulates the pressure and rate of feed of the oil stream to the combustion chamber.

Safety in Oil Burning

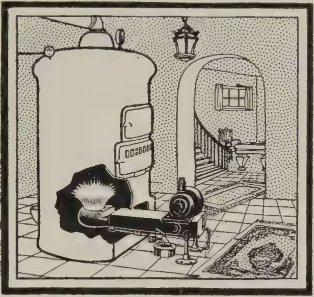
THE **TAG** Shut-off Valve, connected in the fuel lines of oil-burning boilers and other devices, automatically shuts off the oil flow the instant that the steam or air pressure used for atomizing falls below the required minimum. The TAG Valve LOCKS ITSELF and cannot be reopened until the trip lock mechanism is reset by hand, even though in the meantime the atomizing pressure has been brought up to the required point. Absolutely prevents oil leakage into furnace. Our engineering department will be glad to advise you on the application of this dependable protection to your large or small oil-firing installation.

Send for Bulletin F-468

C. J. TAGLIABUE MFG. CO.
18 TO 88 THIRTY-THIRD ST., BROOKLYN, N. Y.

Insist on Mercury Thermometers with the TAG-Hespe RED Reading Column

SINCE 1769



Electric Ignition of Oil Burners

Another Kleen-Heet Triumph

Successful electric ignition, has been condemned by competitors as impossible of attainment.

They figured without Kleen-Heet engineers.

Kleen-Heet guaranteed its electric ignition, the same as its gas ignition. Today thousands of users testify to its practicality, its freedom from trouble, its efficiency and economy.

Another Kleen-Heet triumph!

How It Works

Kleen-Heet electric ignition is a reliable, simple device contained in a removable drawer. It consists of a small Bosch magneto which transmits an electric spark to a point approximately six inches back of the firepot.

Air from the pump and surplus oil from the automatic valve meet at this point and a small primary fire is immediately created. This starts the main supply of oil flowing into the firepot, and the furnace begins to heat the house.

KLEEN-HEET ELECTRIC IGNITION

rounds out a complete line of automatic oil burners.

Kleen-Heet

NO LABOR · NO COAL · NO ASHES

Winslow Boiler and Engineering Co.

General Offices: 208 South LaSalle St.

Chicago

Oil heat for the smallest bungalow to the tallest skyscraper

Many Oil Burner Patents

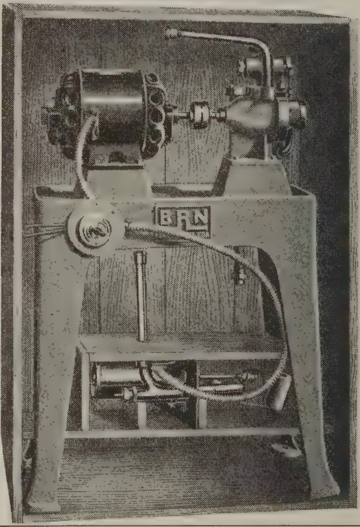
More than five thousand patents on combustion devices and furnaces are said to be in force, in addition to the large number which formerly were in effect but which have run out. Virtually no change in the oil burner patent situation has occurred since the discussion of the situation in a recent issue of **Fuel Oil.**

Nokol Has Best Dealer Advertising Service

One of the most complete systems of manufacturer-dealer advertising of oil burners is that of the American Nokol Company. The company's advertising is in charge of the John H. Dunham Company, Chicago. The Nokol dealer is furnished with a mat service ranging from very small to quite large advertisements, on a basis of pro-rated expense between the dealer and the manufacturer.

Maxon Bulletin Describes Premix

New bulletins on its Premix oil and gas burner industrial burner have been issued by the Maxon Furnace and Engineering Company, Muncie, Ind. In the Premix system a low pressure air blast is delivered to the nozzle with the oil or gas, also under pressure, and the atomization occurs when the oil is sprayed into the air blast. An unusual feature of the Premix is the set-up of the apparatus which enables it to be used for both oil and gas.



BRN
QUALITY PRODUCTS

A Few Reasons Why Dealers Select the

B-R-N Domestic Oil Burner

Because it burns a low grade fuel oil which costs the user from 25 to 30 percent less than the high grade oils.

Because the cost of installation is less due to the fact that it is shipped completely assembled ready for operation.

Because the cost of service is less, owing to the fact that there are but three interchangeable major parts to be serviced, any one of which can be replaced in fifteen minutes; sending the defective part to the factory for service.

Because no gas is used, for we ignite and control perfectly with electricity.

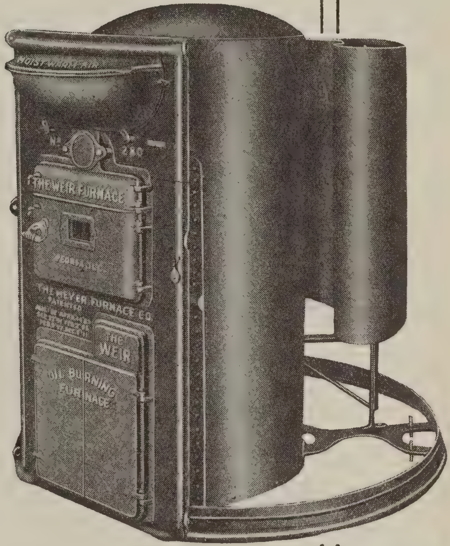
For distributors' territory.

Write

Blake-Raymaker-Nauman
1223 So. Michigan Ave.
Chicago, Ill.

Get the Facts about the WEIR

the one
proven
warm air
furnace
for oil
burning



The WEIR Oil Burning Furnace

Manufactured by

The Meyer Furnace Company

Peoria, Illinois

LILLIBRIDGE
OIL VAPOR BURNER
Listed as Standard by Underwriters Laboratories
Tested by Iowa State College, Ames, Iowa, and proved highly efficient.
They last and satisfy.
Reliable dealers wanted
LILLIBRIDGE HEATING CORP.
Hutchinson, Kansas

The guide and text book for industrial users of fuel oil is
"Fuel Oil in Industry"
By Stephen O. Andros
Price $3.75
FUEL OIL for Heat & Power
350 Madison Ave. New York, N. Y.

An Unconditional *Guarantee*
COVERS ALL
»ARROW→
Oil Storage Tanks
Let us send you details of our offer. The tank is as important as the burner to make the entire installation efficient.
We gladly give advice on your tank problems.
The Novelty Steam Boiler Works Co.
929 S. Howard St. BALTIMORE, MD.

Large Fuel Oil Concern Being Formed?

It is reported that plans are under way for a merger of several leading oil companies into an organization which will be the largest oil fuel factor in the world. Reports are to the effect that American oil men concerned in the plans see an outlook for a tremendous increase in demands on railroad fuel oil once the proposed railroad consolidations in the American Southwest are effected. According to this view, the consolidations will result in several large railroad divisions turning to oil for fuel for their locomotives instead of continuing the use of coal burning locomotives.

Liberty Pamphlet Presents Arguments

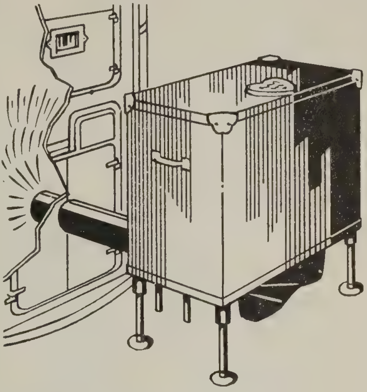
Many arguments in favor of oil burning in general and the Liberty Oil Burner in particular are contained in a pamphlet that has been published by the Liberty Oil Burner Company, Omaha, Neb., citing convenience, cleanliness and cheapness as oil's advantage over coal. The Liberty is a vaporizing, gravity feed burner and has a peculiar gooseneck air flue that forces the incoming air draft directly down on the burner plate upon which the oil flows to burn. This spreads the flame out into a wide fan, according to the pamphlet.

A new gravity burner known as the Automatic Gas Oil Burner has been introduced in Chicago by the Automatic Gas Oil Burner Company.

SAFE—The absolute safety of the HART OIL BURNER caused it to be chosen by a leading Fire Chief from amongst many other burners.

DEPENDABLE—34 years of manufacturing experience are incorporated in the building of the HART OIL BURNER. Each mechanical part is made of the very best material in order to give absolute dependability.

ECONOMICAL—The HART OIL BURNER uses a low gravity fuel oil which is high in B. T. U.'s and consequently is very economical in operation. This burner is automatic in every detail.



Hart Oil Burner Co.

Department 101 **Peoria, Ill.**

"HART HEAT"

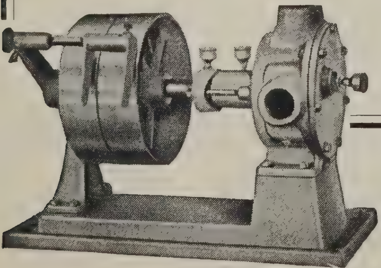
A Dependable Pump for Oil Burners

The VIKING Universal Pump is scientifically designed to produce a steady, continuous flow of fuel to the oil burner. It handles all weights of oil equally well.

Having but two working parts, the durability of the VIKING is assured. High efficiency and economy of maintenance and operation distinguish it.

The VIKING carries an absolute guarantee against leakage. Ask for the new catalog.

Viking Pump Co.
Cedar Falls, Iowa



VIKING PUMPS

Fuel Oil Price Average

During the last ten years the average price of fuel oil per barrel (42 gallons) has been $1.23, according to the table compiled by Joseph E. Pogue. The month during which it was the lowest—65 cents a barrel—was March 19, 1915. Its highest price during this period was $3.24, reached during June, 1920. Not since January, 1921, has the price risen

New Oxo-Gas Burner Placed on Market

An addition to their line of Oxo-Gas burners has been made by the Gloria Light Company, Chicago, with the introduction of the new Big Four furnace burner, which operates on the same method of fuel-preheating as that employed in the smaller Oxo-Gas burners used in heating stoves. However, it is larger and intended to be used in furnaces. Preheating the oil to turn it into vapor, or gas, is accomplished in a triangular chamber which rests on standards that lift is a few inches above the burner plate so that it is entirely in the burner flame.

The Kemp Oil Burner Company was recently incorporated in Brooklyn, N. Y., with a capital stock of $80,000. The new organization has already obtained a factory, installed equipment and has started the manufacture of burners.

Quality And Dependability

That is the goal we have been striving for since the inception of our business. Not how many oil burners can we sell, but how perfect an oil burner can we produce.

Every feature of the Chalmers Oil Burners is built up from standardized units. It is extremely simple to operate, enduringly strong, and positively automatic in all its actions.

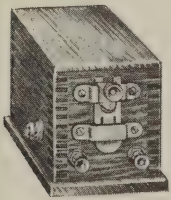
We can unhesitatingly point out our previous customers, knowing that they have only the highest praise for the Chalmers.

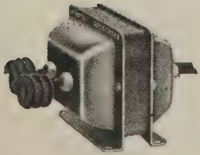
Correspondence with substantial parties, looking to permanent affiliations is solicited.

Chalmers Oil Burner Company

Minneapolis, Minnesota

Member American Association of Oil Burner Manufacturers.





Safety and Convenience
with

Jefferson
Electric Ignition and Control

In the sale of an oil burner there are questions that must be answered. The consumer has the right to know—

Is its operation dependable?
Is it economical?
What degree of convenience does it offer?
Does it assure perfect safety?

These are logical questions and must be answered by fact. Jefferson Electric equipment answers them for you!

Jefferson Coils deliver an intensely hot spark which gives positive ignition to gas pilot or fuel direct; thus eliminating possibility of oil or pilot gas accumulating.

Jefferson Transformers, furnishing power for thermostatic and relay mechanism, insure constant, even temperature and do away with human uncertainty.

Jefferson equipment offers a fully perfected system for ignition and control of oil burners. Leading manufacturers are realizing the sales value of these Jefferson Specialties and are making them a part of their standard equipment.

Write us today for further information.

Jefferson Electric Mfg. Co.
434 South Green St.
Chicago

Philadelphia Distributing Agency Sold

The Cornell Utilities Company, Inc., formerly Philadelphia and New York City distributors for the Nokol Automatic Heater, have sold the Philadelphia business to Buckley and Scott Company. William C. Brown is general manager of the Cornell Company.

Soot From Oil Burning Does Not Contain Ash

Soot resulting from oil combustion is different in character from that resulting from the burning of coal. It contains no ash, but does have more or less unburned oil in it. Soot deposits from oil fuel have more heat insulating properties than soot arising from coal combustion. The carbon content has a greater insulating effect, and the soot is of a fluffy nature which adheres easily to the tubes around the entire surface instead of at the top of the tube only. Also, when coal is burned in a furnace, then gas and finally oil, it has the effect of loosening all the accumulated soot in the chimney.

Tests performed recently on the heating plant of the Singer Building, New York City,showed an over-all efficiency of 68 per cent with coal and 80 per cent with oil.

Several new folders and pamphlets have been issued by the Aeroil Burner Company, Union Hill, N. J., describing recent additions to its line of "Smokeless" portable heating kettles and torches.

Endorsed by Heating Contractors

There are very definite reasons why leading heating contractors and a majority of home owners have selected the SUN Oil Burner. Space forbids their mention here. Be sure to mail the coupon with your letterhead so full details may be sent you at once.

Exhaustive tests and wide experience in the science of combustion and heating principles have developed the SUN'S perfection. State and city franchises are going rapidly. We invite correspondence with reputable firms seeking the wholly successful oil burner. Write today.

Heat Equipment Corp., 134 So. 13th St., Lincoln, Nebr.

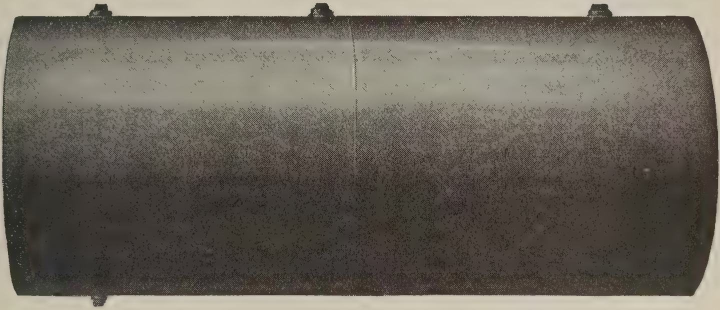
The Sun
TRADE MARK
AUTOMATIC
OIL HEATER

Clip, Pin to Your Letterhead and Mail

Heat Equipment Corporation
134 So. 13th Street, Lincoln Nebr.

Please send full facts about your SUN Oil Burner, including dealer prices, etc.

TRADE Leader MARK



The Logical Tank

For the Dealer Who Cares

If the burner is right and the tank is right then every installation will render quiet testimony to the integrity of the dealer who installed it.

Leader builds and guarantees quality tanks for every burner need. Of the thousands of tanks shipped out for burner use not one has ever come back.

Measuring gauges, vents, fill pipes, etc., are a part of our complete line.

Your order will be shipped immediately from stock.

Send for Special Bulletin and Price List No. 11

LEADER IRON WORKS, *Decatur, Illinois*
2118 N. JASPER ST.

Based On a Different Principle

NEW PROCESS
OIL BURNER

By a shortened chemical process gas oil or distillate is converted into city gas, instead of cracking the oil into ethylene and acetylene. City gas will burn as low as 600° F. Ethylene requires 1600° F. The hydrogen of the acetylene explodes with a series of explosions, causing the roar, and drops the carbon.

The CARY NEW PROCESS OIL BURNER no more requires gravity or artificial power draft than does a gas stove. 81% heating efficiency with 15.1% CO^2 are not uncommon.

Silent. Not less noise—no noise. No mechanical parts to wear out. The price is very reasonable.

Every CARY dealer says business is good.

CARY & COMPANY
Cary Bldg. Minneapolis

THREE VARIABLES IN THE OPERATION OF THE INDUSTRIAL BURNER

(Continued from page 19)

of oil by weight flows into the boiler. This may be known as the "critical point." Beyond this point, continued heating will increase the volume of oil delivered to the burner, but will decrease the capacity of the burner. This may cause the burner to vibrate, break down the oil in the pipeline and cause accumulation of carbon at the burner tips.

Roughly speaking, practically all fuel oils have the same general character, and can be burned with the same vane opening, air pressure or draft, and oil pressure, when heated to the temperature point referred to above. While this is generally disregarded, heating above this point leads directly to heat waste and consequent expense, dissatisfaction and often to outright failure of the oil burning system, when proper arrangement would have showed efficient results.

Co-operation Is Best

As to the proper pressure, it will be well for the engineer in charge of the oil burning unit to get the opinion of the manufacturer on this factor, and then maintain that pressure, regardless of increased or decreased load, and adjusting the temperature of the fuel to the point referred to as being most desirable.

It would be entirely erroneous to go so far as to say that all oil should be operated at the same temperature, although the point made above, that oils are generally very similar in characteristics, is true.

"THE FUELITER"

A Patented Electrical Fuel Oil Igniter

Works perfectly on all grades of low gravity fuels

Economical—Modern—Safe

Unlike anything on the market

Positively the best igniter made

The use of a gas pilot for oil heating ignition is equivalent to a candle for lighting. Gas pilots are subject to freezing, which involves still greater dangers.

Oil burners equipped with **"The Fueliter"** make for ideal oil burning conditions. It is just the thing that oil burner manufacturers have been looking for.

We will be glad to demonstrate its efficiency over anything you are now using.

Manufactured exclusively by

VOGE ELECTRIC CO.

1610 S. Michigan Avenue **Chicago**

Experimentation is about the only guide. Often two lots of oil from the same source will require different temperature adjustments. This is a fact in favor of quantity purchases of oil, which enables the oil burning units to be operated under conditions which are continuously proper, and also enables the engineer to omit much of the experimental work necessary before he can determine proper operating conditions.

Proper Mixture Necessary

There remains the question of proper air supply to give complete combustion. Oil may be delivered to the burning unit at a constant pressure, and at theoretically the correct temperature, and still there may be inefficiency unless the oil spray is mixed with air in the proper proportion. The mixture must enter the boiler in he form of a perfect gas for efficiency. A light brownish or gray haze at the top of the stack may be regarded as indication that good combustion is being had. It is desirable for the best results that a rich yellow flame fills the furnace or boiler without gaps or holes which gives the air a chance to pass through unconsumed. Many engineers do not realize that high flue temperatures are in some cases directly attributable to excess air being supplied to the burner. Cutting down the air often has resulted directly in lower stack temperatures. This comes under the head of that type of efficiency known as absorption efficiency. Many of the best engineers now log their stack tempera-

GOULDS

Hand Rotary Pump for Fuel Oil Systems

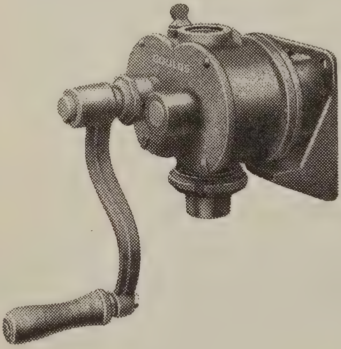


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings for handling distillate.

Furnished with bracket for attaching pump to side wall. This is a big improvement over the type that depends on pipes for support.

Capacity—10 gallons per minute.

Note:—We also have a complete line of motor driven pumps for the same services.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. Seneca Falls, N. Y.

When Winter Comes

Be sure that the bottom of your oil storage tank is not covered with a layer of water which will freeze and spread the tank seams and clog the pipes. Be sure, also, that the oil you buy does not have a high water content, for the heat value of oil is reduced 13.14 B.t.u. for each one per cent of water it contains.

Guard against these water evils by using the

Oil News Water Detector

It is a weighted brass rule upon which is fastened a special detector paper. The rule is lowered into the tank, to the bottom, and the paper, which changes color when it strikes water, indicates the depth of the water there. It is easy to use, quick and efficient.

Price $1.00

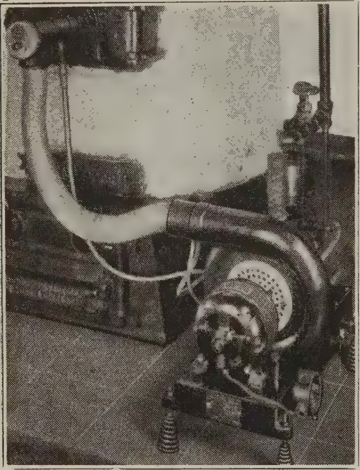
Supply of detector paper sent with each detector.

Oil Trade Journals, Inc.

350 Madison Ave.,
New York, N. Y.

20 E. Jackson Blvd.,
Chicago, Ill.

We Want *Only*
RELIABLE DEALERS
Who know Oil Burner Installation or Are Willing to Come to Our Plant to Learn.



"A-L-A-D-D-I-N"
The Burner with the Least Possible Service Required
ALADDIN OIL BURNER CORP.
740 So. Michigan, Chicago

tures daily, recording these upon the stack thermometers, although it is to be regretted that some engineers not only fail to make use of the thermometer, but apparently do not even realize its existence. Material variations of the logs of these stack temperatures should be a signal for prompt investigation of some factor bearing upon the operation of the unit in question.

In conclusion, it may be said that maximum efficiency is that Utopia for the modern combustion engineer which of course can never be attained any more than absolute perfection in any line of human endeavor can be realized. That very fact should cause engineers to realize there is plenty of room to work for improvement in the operation of the oil burner, as in the working of every other mechanical device.

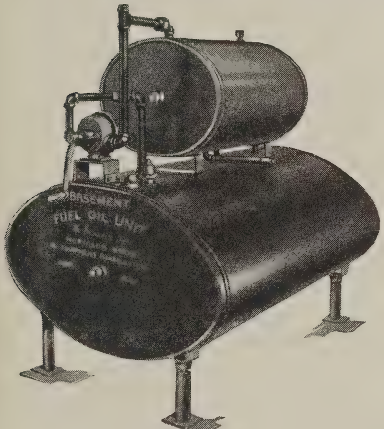
New Burner Being Made in Kansas City

An automatic burner known as the Security has been placed on the market in Kansas City, Mo., by the Security Stove and Manufacturing Company. The combustion chamber in the Security is equipped with a tripod to hold it at the correct level. The motor and fan are attached to a bracket that fastens to the ash door or firebox door of the furnace, depending on the height at which the burner is to be placed.

Courses in the fundamentals of oil engines are being offered by the Brooklyn Polytechnic Institute, Brooklyn, N. Y. Classes are held one night in each week.

OVAL Fuel Oil Tank

That Goes Through Basement Door



The domestic fuel oil tank belongs in the basement, easily accessible. Why disfigure the yard with an outside tank, above or below ground? Why unnecessarily cut through basement walls with fuel pipes?

The 250-gal. MORRISON supply tank clears any ordinary basement door because IT IS OVAL. Complete with 50-gal. auxiliary tank and rotary pump. Compact unit, including connecting pipes, overflow pipe and magnetic gauge. 14-gauge black galvanized steel tanks. Conforms with Underwriters Laboratories regulations.

Outfit complete, $120. Rotary pump and magnetic gauge sold separately, if desired. Pump, $12, gauge, $5. Write for literature.

We supply the oil distributing trade with a complete line of oil equipment which includes truck tanks, above and below ground tanks, brass goods, pumps, etc. Write for prices on your needs.

Morrison Bros.

"OIL EQUIPMENT HEADQUARTERS"

Dubuque, Iowa

CONSULTING PAGE

Q. Kindly advise what the cost will be for making a complete analysis of our fuel oil. What quantity of oil is used for the test? L. L. W., Frankfort, Ind.

Ans. The Dearborn Chemical Laboratories, 332 S. Michigan Avenue, Chicago, will make a complete analysis of an oil, including the carbon residue test, for $10. Without the latter the charge is but $5. This includes also the gravity, flash, fire tests, etc.

The Kansas City Testing Laboratories, 701 Baltimore, Kansas City, Mo., is also equipped to make oil analyses. Their charge is the same. If you desire an extremely accurate, detailel and authentic analysis, you should send your oils to the Bureau of Standards, Washington, D. C., the accuracy of whose findings is vouched for by the Government.

Your sample should contain from 6 to 12 ounces; the laboratory will specify the correct amount. Small portions of the total sample should be taken from all parts of your tank, so it will represent the entire stock of oil.

Q. Kindly advise us what is the best material to use between the burner and the inside of the furnace walls to keep the air from coming up from the ash pit instead of through the ports provided in the burners. J. S. P., Philadelphia, Pa.

Ans. We believe you will find plastic fire clays best to use between the burner and the inside of the furnace walls for the purpose you describe. The advantages of such clay are obvious, especially when the contours of the furnace walls are irregular. In such instances they are difficult to match with ordinary brick.

Q. Have you a list of the prices paid for the various gravities of oil used in oil burners, showing the price fluctuations over a period of years? We want to use such a list in sales arguments to overcome the propoganda used by coal dealers here and elsewhere. J. A. C., Chicago.

Ans. On page 22 of the March issue of **Fuel Oil** there was printed a table giving the average price of price of fuel oil in the United States by months, from January, 1913, to January, 1924. This is the heavy fuel oil that cannot be used in most domestic burners. However, you can figure that 34-36-38 distillates average from one to two and one half cents more per gallon than the heavy oil and follow the same price fluctuations. Exact prices for different grades of distillates during the last two years can be found in your oil files of **Fuel Oil,** each issue carrying the price averaged during the preceding month.

Q. Where can we get further information on the Todd Oil Burning School, the subject of a short article which appeared on Page 46 of the July isue of **Fuel Oil?** L. L. S., Wabash, Ind.

Ans. You should write to the Todd Oil Burning and Engineering Corporation, 742 East 12th Street, New York City.

Q. Which of the following methods would result in the most efficient combustion, other conditions, such as the amount of air, etc., being correct: (a) the oil being atomized wth a blast of air and the two mixed before ignition; or (b) the oil being vaporized and ignited and the air being mixed during and after ignition? D. H., Fairhaven, Mass.

Ans. We believe you will find (a) the better method of breaking up the oil for combustion, especially if you contemplate using oils heavier than 38-40 distillate.

Q. Can you give me a practical method of removing scale and soot from a boiler which has been in operation for some time previous to the installation of an oil burning system? K. D., Zanesville, Ohio.

Ans. It has been found that the burning of a liberal amount of salt in a boiler will be effective in combating scale and soot. The fumes of this salt, allowed to go up through the flues, will cause the accumulation to drop off in big flakes, leaving the surface of the metal clean. The salt may be burned in a ladle or container of some kind. In one instance treatment of this kind increased the efficiency of a boiler something like fifty per cent.

Q. Do you know of any oil burner that is made to be installed in an Arcola Heater? H. S. T., South Jacksonville, Fla.

Ans. The Monarch Sales and Equipment Company, St. Louis, Mo., makes such a burner. It is known as the Speers and uses a gravity feed principle.

FACTS, INSTEAD OF FANCIES, ABOUT HOME OIL HEATING

(Continued from page 16.)

tom of fire box the air would follow it. With the back draft almost closed, the air supply was fairly automatic and the chimney losses very low. It should be fully understood that this applies to a given boiler and that other boilers may, and no doubt will, require different treatment. The fact does remain, however, that certain fixed principles of combustion must be recognized and followed.

We will take up first the capacity of the burner, and under this heading we will include the cost of operation. On February 15, 1923, the capacity was tested, as this was the coldest day and required the most hours of continuous operation. The burner adjustment called for two gallons of oil per hour and this setting with the absolute pressure control made the oil consumption, for practical purposes, a constant. The data for this particular day is given in Chart I.

The air and oil pressure were 1 lb. and 14 oz. at the nozzle—considerably below the maximum—so that the matter of capacity was no longer in doubt. It might be said here, relative to air pressures, that the pressure named seemed to be all that was required to break up the oil stream. Higher pressures apparently did not add to the heat given up, that is, to the efficiency.

An idea of the cost of operation may be had from Chart II.

These figures are for the residence above referred to and tally very well with the cost for the season of 1923-24. This same residence heretofore required approximately eighteen tons of hard coal, so that from the standpoint of annual cost of heat, the proposition is satisfactory, no account being taken of coal dust, ash handling, etc.

In the matter of continuous operation, very much may be said against oil burners and my observation is that it applies generally. This is only an appeal to the designers and manufacturers of oil burner apparatus to get both feet on the ground and stop trying to sell the impossible. A burner may be well

Chart II

Electric current—Jan. 1 to May 1.					172.8 k. w.
Gas " "					4740 cu. ft.
Jan.	hrs.	Total	744	Operating	231—10
Feb.	"	"	672	"	282—20
March	"	"	744	"	236—20
April	"	"	720	"	107—10
Total hrs.			2880	Total operating hrs.	857—00
Electric current consumed in watts per hr.					202
Gas consumed in feet per hr (Total hrs. 2880)					1.6
Gas consumed in feet per hr. (Operating hrs. 857)					5.5

Annual Cost

3000 gals. oil @ 7c	$210.00
300 k. w. electric currents @ 10c	9.00
9000 ft. gas @ $1.00	9.00
Total	$249.00

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HEATING

designed by a competent engineer both as to the mechanical design and "combustion" design and yet be a failure because it was badly installed or installed in defective heating equipment.

In my care I must confess that it was sometime before I felt really easy about that thing in the basement, but the thought always prevailed that it could be made to do the work as intended. The past season has demonstrated to my satisfaction that a burner will "stay put" if properly designed, properly installed, and given proper oil.

Safety Gauged by Devices

As to safetly of oil as a fuel, much depends upon the infallibility of safety devices and upon the grade of oil used. A test made on 30-32 fuel oil indicates that the high flash point makes of it a very safe fuel. Four gallons were sprayed into the furnace and then ignited in the usual manner, that is, with the gas pilot. Not even a puff resulted. I am not recommending this as an "indoor sport," but it does show that explosions are remote in a proper setting.

As regards the oil most suitable for house heating, there will naturally be a wide difference of opinion. All engineers will, however, agree that no burner can successfully burn automatically a fuel that is not uniform or that is not burner troubles have come from at- clean. It is fair to say that many tempting to burn "anything that will go through a pipe."

Fuel must be uniformly thick or

Thermostat Troubles Eliminated

"Signal" Thermostatic Control Relays eliminate the "weak-link" in oil burner control by absolutely preventing arcing or burning at the thermostat contacts.

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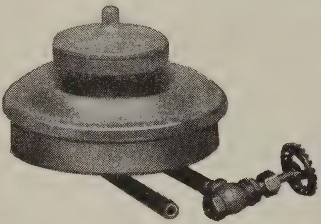

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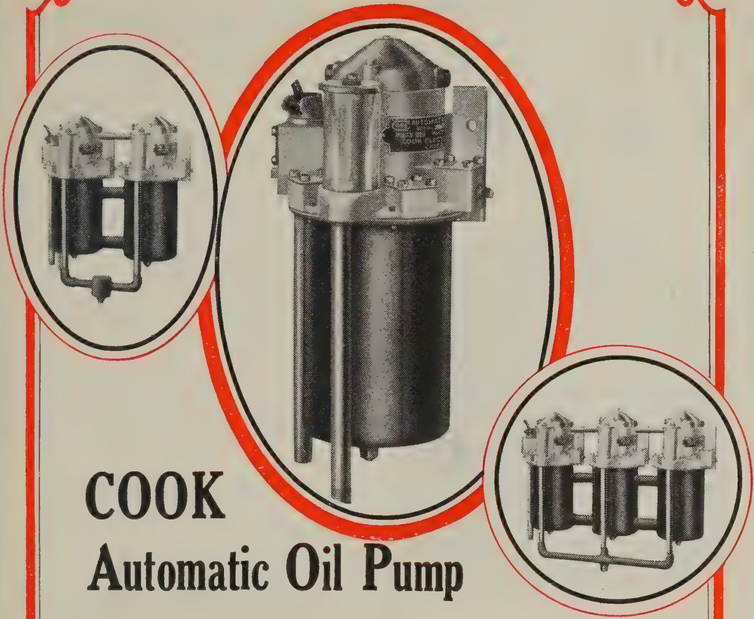
thin at the full range of temperatures encountered. It is to be fully understood that this applies only to automatic operation. For hand operation where generating and atomizing devices are under continuous observation it may not apply.

The pre-heating of oil does not seem to get us enough to pay for the trouble, at least for oil thin enough to be acceptable for automatic burning. This seems to apply to the air as well, although a more exhaustive test on this point may reveal something different. The theoretical air supply as may be registered by CO_2 indicator apparenty does not hold as a measure of efficiency. It appears that some excess air gives better net heat per pound of fuel than does an exact supply of air.

Socony Burner Marketed by Zoning Plan

Restrictive zoning plans are being used in the preliminary marketing of the Socony-Arrow Oil Burner, made by the Socony Burner Corporation, Brooklyn, N. Y., a subsidiary of the Standard Oil Company of New York, according to recent reports from their advertising department. This restriction is due to a fixed policy in the company's sales plan which calls for the development of a service organization at all points to parallel its sales work so that complete user satisfaction will result. Additional branches will soon be started in three new territories.



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It is positive and reliable in its operation.
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Each bellows unit is operated by an individual motor as a separate pump.

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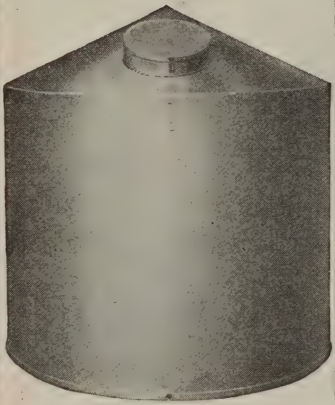

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PREPARING THE WATER TUBE BOILER FIRE BOX FOR OIL BURNING

(Continued from page 10.)

heated gases to ascend quickly, transmitting heat to the boiler heating surface more readily than is the case when the straight baffle is used. Figure 1 shows the Turner baffle installed in a setting which was originally a coal fired setting. The bridge wall is shown moved back, the floor dropped and ample checker work installed. A soot pocket is provided to the rear of the bridge wall. Sufficient furnace volume is thus secured and a long gas path with a spacious first pass gas stream area.

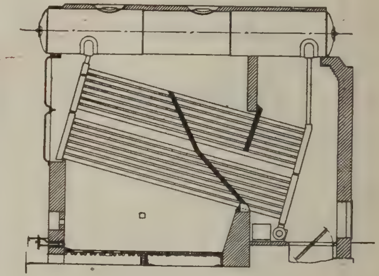

Figure 1.

The chief characteristic desirable in a monolithic baffle is a low expansion and contraction coefficient over a wide temperature range. Expansion and contraction of the baffle must occur without unequal strains if at all and most essentially without cracks. If a homogeneous material can be obtained in which chemical action such as takes place between different materials does not occur, and which retains a highly re-

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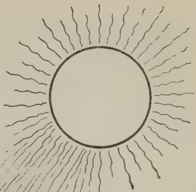

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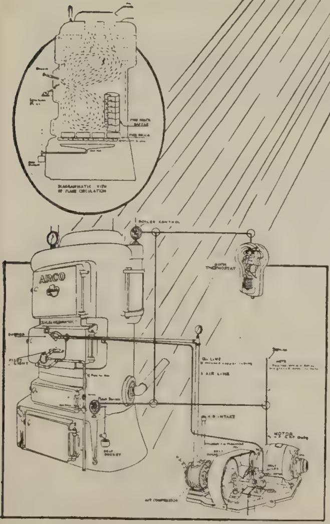

Marvel

Oil Burner Co.

711 Washington Blvd.
CHICAGO, ILL.

fractory characteristic, the ideal baffle material will be found. Manufacturers of monolithic baffle materials claim to have developed just such a material through a process of neutralizing the expansion and contraction qualities, and that it will withstand temperatures up to 3,100 degrees Fahrenheit with insignificent expansion and contraction.

With such a material the baffle may be extended right down to the floor of the setting. It is put in when the boiler is cold, of course, and dried out by building a fire under the boiler. As the temperature is raised the tubes expand, pressing the baffle materia back until it sets in place about the tube when it is expanded to its maximum degree. As the boiler cools the tube contracts away from the material, permitting it to be drawn out in case of necessity unless badly warped or damaged otherwise. If it cannot be drawn it is easily chipped away and may be as readily repaired.

Oil Burning Is Gaining In Washington, D. C.

Heating with oil has made great strides in Washington, D. C., during the last two years, probably two hundred homes, in addition to a large number of apartment and business houses, having installed burners. The advanced cost of all domestic labor has made it expensive to have furnaces attended by outside help and shoveling of coal and ashes is a disadvantage by which agents for oil heating are profiting.

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To meet the pumping problems confronting the oil burner industry, "that of supplying a dependable automatic pumping of oil from storage to auxiliary tank or to burner direct," we announce an addition to our already established line of hand and power operated Rotary Pumps—an IMPROVED AUTOMATIC CONTROL PUMP AUXILIARY TANK UNIT. Complete description regarding will be off the press by October 10th. Immediate deliveries also after this date.

It will be to your interest to write for this information. Meanwhile immediate shipment can be had on M-D-Co. Hand and Power Operated Rotary Pumps.

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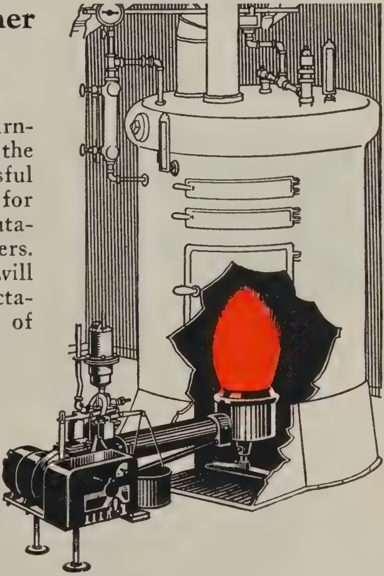


PRACTICAL CONSIDERATIONS IN OIL BURNING

(Continued from page 14.)

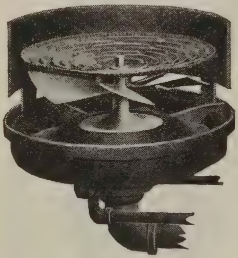
air-tight box-casing on the front of the furnace, having the air for combustion supplied between the casing and the furnace-front by means of blowers or ducts.

(5) *The White System.* In this method each individual register is housed-in, and the air is delivered into the enclosing casing. Either the Howden or White Systems may be advantageously employed where highest boiler capacity is not a paramount consideration, but where more than natural draft is necessary.

(6) *The Blower-Burner System.* The blower-burner is one which maintains its own draft by means of a blower contained in the burner itself. A notable example of blower-burner is the "Self-contained Draft Control Burner" invented by Commander H. H. Norton, U. S. N., and Mr. E. E. Hobbs. The atomizer in this particular burner is located in the center of a hollow-shaft turbine blower, the blades of the latter forcing an air current at high velocity into the venturi which forms the burner register proper.

Tendency Toward Excess Air

It must not be forgotten that in operating blower-burners a very small increment in the pressure of steam to the blower turbine causes a great increase in the amount of air forced through the register; in consequence, with this burner in the hands of unskilled operators there



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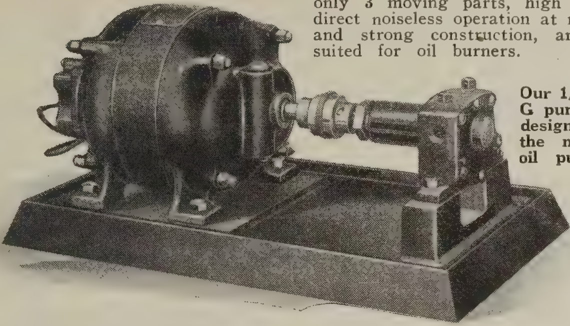

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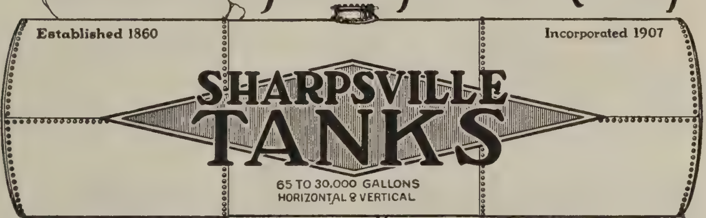

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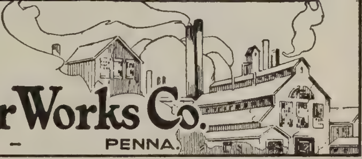

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is a marked tendency toward high percentages of excess air. Firemen enjoy hearing the blower hum at speeds far greater than necessary, but when the blower speed is carefully regulated most excellent results are obtainable.

Criticism may be advanced because the reasons supporting each of the below enumerated items have not been dealt with; but it is believed that in the light of these articles and other monographs which have appeared in **Fuel Oil,** these statements will appear practically obvious.

Summarizing Fuel Oil Advantages

The outstanding advantages of liquid over solid fuel for use in steam power installations may be roughly summarized in the following twenty items:

(1) Reduction of expense in boiler maintenance;

(2) Reduction of more than 60 per cent in labor costs for firing;

(3) Reduction of hard work in the fireroom;

(4) Reduction of smoke to practically a haze when good combustion is obtained;

(5) Reduction of time in cleaning furnaces and flues as efficient oil burning reduces the deposition of carbon to a minimum.

(6) Reduction of amount of temperature variations in the furnace;

(7) Reduction of lost heat in the flue gases;

(8) Reduction of strain on boiler when meeting peak loads;

(9) Elimination of ash;

(10) Elimination of necessity of banking fires;

(11) Increased speed in lighting off;

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1. Quiet ABC is really quiet. Allowances are not made after installation.

2. No Carbon or Soot Engineers know what an immense advantage this is.

3. Less Oil Required Unique means of atomization assures complete combustion. Every particle of oil is burned. The heat rises slowly and is completely absorbed by the boiler.

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5. Burns low-priced oils ABC burns gas oil and fuel oil.

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7. No Unsightly Parts Outside of Boiler This ABC feature has made sales.

8. Simple Only one moving part subject to wear.

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10. Clean It's useless to say how clean ABC is. You must see to appreciate.

11. Automatic Heat when you want it—as you want it.

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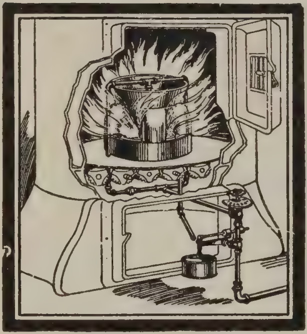

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(12) Increased rapidity in getting up steam;

(13) Increased ability to meet peak loads;

(14) Increased range of, and higher temperatures;

(15) Increased length of time of fuel in storage without deterioration;

(16)) Increased heat value for the same bunkering space to the amount of nearly 50 per cent;

(17) Increased life of the refractory furnace linings because of absence of clinkering;

(18) Increased ease of handling, by substitution of pumps for costly conveying equipment.

(19) Increased safety while in storage, since fuel oil is not subject to spontaneous combustion, and the high flash-point minimizes risk from fire;

(20) Increased all around cleanliness of steam plant and storage spaces.

Although, as has been stated in the opening sentences of these articles, the employment of liquid fuel may never supplant that of coal as *the* combustible, yet oil-burning installations will be found in ever-increasing numbers as time progresses. Until a high development of water power resources is accomplished and, perchance, the broadcasting of the electrical energy thus created; or until we are able to avail ourselves directly of the sun's capacity for work; or until we can successfully harness interatomic force—or as some pessimists will have it, the supply of oil and coal gives out—until then, oil will be necessary in ever-increasing quantities.

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FOR HEAT and POWER

Devoted to developing and encouraging the efficient, scientific use of oil fuels.

Published Monthly

Vol. 3 November, 1924 No. 5

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Oil Burning Research

Domestic Burner Installations Are More of the Same Pattern Than Are Industrial Installations

By G. S. Meikle

EARLY in the winter of 1920, a New York industrial client requested a very thorough investigation of the possibilities of heating his twelve-story factory with oil. It had become difficult, practically impossible, for him to purchase coal in order to maintain continuous operation.

Fuel Code Imposed Burden

At that time the administrative body of New York City was operating under a fuel code which had already become obsolete and which made it practically impossible to obtain approval on any industrial oil-burning system. The legislative bodies of the city were, however, already beginning to realize the necessity of a revised code and had begun investigations. These have resulted in a code embodying not only industrial but also domestic installations.

Being apprized of the attitude of municipal authorities, the client authorized an extensive survey of the various oil-burning installations throughout the N. E. States where the codes are more liberal and the burning of oil as fuel is encouraged.

Studied 60 Industrial Installations

During the survey, including the careful study of some sixty industrial installations selected from over five hundred located in the vicinity of Boston, Mass., and Providence, R. I., it was opportune to consult with the foremost oil-burner experts of the East. Invariably our conversations led to a discussion of the possibilities of the domestic oil burner. For surely, if it were to be difficult to secure a supply of bituminous coal for industrial purposes from the widely distributed soft-coal bearing areas, it would probably be equally or even more difficult to secure hard coal for domestic purposes from the very restricted areas of anthracite supply.

Invariably, these men offered the opinion that the domestic oil burner was not a matter for immediate consideration, especially in the Eastern territory, and cited in support of this contention the difficulties experienced in the few attempts in the domestic field at that period.

It is my opinion that today these men, some of whom have become leaders in the industrial oil-burner field, might express themselves much in the same manner as in 1920. There is abundant reason for their reluctance to champion the domestic oil burner in any of its many existing forms. To them the burner itself, while an essential part of the installation, is by no means the most important factor. They have learned to appreciate that every industrial installation presents a complex problem in itself, each calling for the highest order of thermal engineering ability. Were the industrial oil burner manufacturer to sell his burner complete with accessories to the customer in much the same manner as the domestic burner is sold, I am certain that much less favorable comment would be heard concerning the high efficiencies attained in the industrial field.

"The burner itself, while an essential part of the installation, is by no means the most important factor." Mr. Meikle's terse statement might well be written on sheepskin, and riveted in the hat band of every purchasing agent, engineer, and particularly every domestic burner manufacturer in the land. In subsequent issues Mr. Meikle will discuss some of the "most important factors," as disclosed in a long series of tests.

When the industrial oil-burner manufacturer sells his particular burner, he is thoroughly convinced that it will render the service for which it is designed and proceeds to install it in such a manner that it will accomplish this service. The grates are removed. In all probability the burner itself provides for the proper introduction of primary air. If so, the firebox of the boiler is reconstructed and provided with baffles for properly introducing heated secondary air for completing primary combustion. Other baffles are introduced, where necessary, to break up and conduct the hot gases in such a manner that the maximum amount of heat may be absorbed by the water-heating elements of the system. When the installation is completed, feats previously considered impossible when burning coal under boilers may be accomplished and much higher efficiencies are obtainable.

There is little wonder that this type of mind looks askance at the domestic oil burner and the present methods of handling the problem. And yet, in spite of this conservative opinion, the domestic oil burner field was opened up by men whose vision portrayed the future utility value of domestic burners. By aggressive local and national advertising, many types of burners, good and bad, have been forced into the hands of the public

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Avoid the Overloaded Burner

Boiler Rating and Capacity Must Be Considered to Avoid Overtaxing Boiler and Burner

BY GEORGE W. GRAVES *

GRANTING that the total tax upon the heating system under consideration has been established, in the survey for the installation of the oil burner, the next important question is the boiler rating and capacity, and the determining if there is a correct relation between the total tax and the boiler capacity.

The principles with which Mr. Graves deals in this article pertain to dangers lying in installation of undersized burners, and the installation of any burner in plants where fundamental faults of the heating system exist. In such cases, worthy burners may be overloaded and dissatisfaction result, through no fault of the burner. This is the first of a series of articles by Mr. Graves on burner survey and installation.

Where the name and number of the boiler is known (this usually can be found on the boiler itself) the rating of that particular machine can be found in the manufacturer's catalogue. A file of catalogues covering boilers and furnaces most commonly used will be found useful.

Where the name and number is shown, but the boiler is such an old type that it is no longer listed, comparison should be made with any standard make boiler having the same grate area and the same quantity and size of sections or tubes, which will give an approximate idea. A more exact method is to figure the B.t.u. release of the boiler by using six pounds of coal per square foot of grate area and converting the B.t.u. release thus obtained to square feet of capacity. All these figures may be obtained from standard formula contained in all heating engineers' handbooks, but are so elaborate that it is not advisable to use them in these isolated cases, when the basis above is acceptable. When hard coal is the basis of figuring, four and one-half pounds per square feet, figured at 1,300 B.t.u. per pound will give the required radiation.

Care must be exercised by the one who fixes the correct size of the burner to be used in a heating plant after the survey or engineer's inspection has been completed. Dealers should at all times figure conservatively when determining the size of burner necessary and should never take a chance on overloading a burner. When the data submitted by the engineer shows that the demands approach the maximum capacity of one size of burner

(Continued on page 44)

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* Engineer, American Nokol Company.

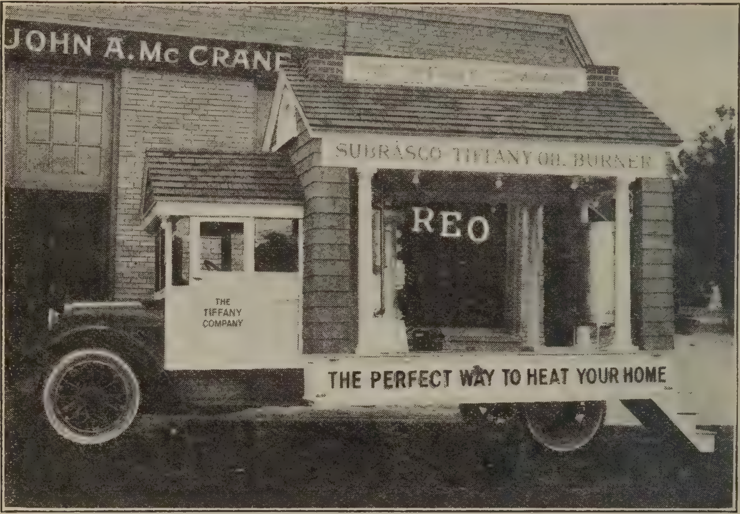
JOHN A. Mc CRANE
SUBRASCO TIFFANY OIL BURNER
REO
THE TIFFANY COMPANY
THE PERFECT WAY TO HEAT YOUR HOME

Exhibit Mounted on Truck Is Result Getter

This cleverly designed exhibit has been used by the Tiffany Company to advertise, sell and arrange dealerships for the Subrasco-Tiffany Burner throughout the New England States during the last few months. Because it is mounted on the truck it can be quickly and easily moved large distances. Stationing it at state and county fairs and other similar gatherings has produced many sales and enabled the company to get some excellent dealer connections, according to Homer A. Tiffany, president of the company. The heating unit is complete to the last detail and operates just as well as though it were installed in a stationary house. The open-air type of house rather adds to the glory of the burner, Mr. Tiffany says, for the attitude of the observer, is generally "If she can heat that house, she can heat any house."

Bulletin Urges Modernization

Appealing to the current desire to "modernize" all domestic equipment, the Gill Manufacturing Company, Chicago, Ill., has issued a bulletin urging the complete modernization of heating plants by the installation of oil burners. Some very good photographs and drawings of Gill burners in operation are given.

The entire navy of the Republic of Argentina is being outfitted with Bethlehem-Dahl oil burners at the Bethlehem Shipbuilding Corporation docks in Boston. The battleship is the Rivadavia and the cruiser is the Moreno.

Proper Setting for the Oil Fired Water-Tube Boiler

Best Construction of Foundation, Floor, and Walls Setting for Inclined Type for Economy and Efficiency.

By C. C. Hermann

BESIDES those having a shell which is parallel to the tubes, and horizontal, there is a type of water-tube boiler in which the shell is made parallel to the tubes, but inclined away from the horizontal the same angle as the tubes, namely 22 degrees. This type, of which the Heine boiler is an example, is illustrated in Figure 1.

Tubes Expand Into Header

The tubes are expanded into a single large header which connects to the drum. In the Babcock & Wilcox boiler of this type, the headers consist of a number of sections, each accomodating a vertical row of tubes and individually connected to the header. The Heine header provides large capacity for the down-take and up-take water.

Feedwater is introduced into the front of the steam drum, flows directly into the mud drum and passes on to the rear header where, being colder, it drops down and passes into the tubes, where it is subjected to the hot gases and then up through the front header into the steam drum. The steam take-off is also located at the front end of the drum and moisture is removed from the steam by the system of dry pipes installed at this point. Because such a large rear header is used, additional mud drums are not required. Two blow-off points are provided, one from the mud drum or mud section within the boiler drum, and one at the bottom of the rear header.

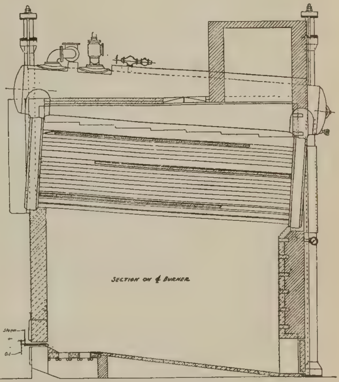

Figure 1.

It will be noticed in Figure 1 that the lower baffle lies between the lower tubes and extends well to the rear end, causing the gas of combustion to pass between the rear end of this baffle and the rear wall.

Another baffle is placed between two rows of tubes higher up and extends from the rear wall to a point near the front wall. A third baffle lays upon the top row of tubes and extends from the front wall rearward to a point near the wall. The gases of combustion, or rather products of combustion, now pass to the uptake breeching or stack. The breeching or stack is located over the rear end of the shell.

The shell and tubes incline toward the front at an angle of about 22 degrees; therefore the water line on the shell at the rear will be higher up on the shell than at the front. The brick work protection for the shell must extend down slightly past the water line at all points along the shell so that to obtain maximum exposed surface the top covering of the furnace must take the same angle front to rear. In some installations, however, the brick work is carried up to the proper point on the shell at the rear and then carried forward horizontally. The width of the setting is governed primarily by the number of tubes in each horizontal row and is wider than the diameter of the shell. The side wall is then corbled in at the top to meet the shell along the side. The shell is covered above the water line (which includes the entire top of the shell) by either insulating brick or an insulating covering.

With the type of boiler described here by Mr. Hermann, the air can be pre-heated before entering the combustion chamber by laying firebrick in such a manner as to form small tunnels through which the air passes, to traverse the length of the boiler twice and in such close proximity to the burner flame as to render it extremely hot when it emerges into the combustion chamber immediately below the burner nozzle. A diagram illustrating this manner of laying the brick will be furnished readers of **Fuel Oil** *on request.*

The foundation for the setting may be made of either brick, stone or concrete. There is no call for refractory material in the foundation and, in fact, a refractory would would in most cases be too easily crumbled to withstand the weight necessarily supported. Common brick, possibly pavers, are best suited for the foundation masonry, although concrete will do as well if kept below all possible heating points. Heated concrete chips when it contains moisture or when cold water comes in contact with it when it is heated.

The floor of the combustion chamber is usually constructed of common brick, concrete, or simply a cinder fill. If of concrete, it is best to put on a thin layer of crushed cinders and then a layer of fire brick. In fact, fire brick should be laid on the exposed surface of the floor in all cases. The air ducts for oil burning are constructed by the use of common brick.

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Oil and Coal As Locomotive Fuels

By M. C. M. HATCH*

THE locomotive fuel problem is, in its last analysis, entirely an economic one. The fuel that will give us, all things considered, the greatest amount of work at the draw-bar for every dollar expended is the one to use. In many parts of the country this problem, as between oil and coal, is non-existent as either one or the other is not available at a price which makes its consideration possible. Years ago I coined a word, "ecoefficiency." This was because I felt the need of expressing the combination of "economy" and "efficiency," words often used synonymously, but which are, in engineering practice, by no means the same. Oil, burned in a locomotive firebox, will always give higher combined efficiencies than will coal, and its handling expense is always less, but its use is not always economical. What the new word means is the attainment of the highest efficiency procurable at a given ultimate cost and this is the answer to the whole thing.

Oil Is Always Superior

Physically (and probably chemically) oil is always and in many ways superior to coal as a locomotive fuel. Some of its advantages may by listed as follows:

Ease of transportation.

No loss from "weathering" in storage.

Elimination of pilferage or loss in transit.

Marked reduction in roundhouse labor.

Higher combined furnace and boiler efficiency.

Elimination in firing tools.

Manual labor of fireman reduced to the minimum.

Reduction to nil of damage claims account fires set out by locomotives.

Smoke control (particularly advantageous in passenger service).

Reduction in cost of firing up and in stand-by losses.

Quicker turning of engines at terminals.

Fewer fuel supply cars needed to be handled in transit.

Has Few Disadvantages

Oil has few, if any, disadvantages. Some mechanism is added to the locomotive over that necessary with coal, hand-fired, but less than when standardized and gives little trouble, either in operation or in maintenance. Steam-atomizing, flat-flame burners, located at the front of the fire pan are now universally used and this general principle seems to be correct, materially reducing punishment of fire box sheets and tube ends, lengthening flame travel and increasing available combustion space volume. If a burner will fire the boiler up to its evaporative limit without objectionable smoke and with an absence of oil droppings in the pan it is functioning properly and little more can be asked of it.

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* General Mechanical Superintendent, Missouri-Kansas-Texas Railway Company of Texas. From a paper delivered before the International Railway Fuel Association.

An oil-burning locomotive should show a gray haze at its stack, this being a general indication of better combustion efficiency than is an absolutely clear stack. The latter can be, and generally is, caused by a large excess oxygen content of the flue gas and this will entail a much greater heat loss than will the very small per cent of CO that may be present if the gray haze is in evidence. Heavy smoke should, of course, not be made, as it is objectionable in appearance, heat loss (though often much less than the clear stack) and causes deposit of heat-transfer-retarding soot on the boiler heating surfaces.

When Mr. Hatch states that "Oil, burned in a locomotive firebox, will always give higher combined efficiencies than will coal, and its handling expense is always less, but its use is not always economical," he is giving an intelligent analysis of their merits as locomotive fuel. No fuel is absolutely the best and cheapest for every use and in every locality. Source of supply, price and many other factors are to be taken into consideration. However, in the great majority of cases, oil is actually the best and cheapest fuel, most efficient, and certainly the easiest and cleanest to handle.

When we buy a ton of coal or a barrel of oil, all we are interested in is the number of available heat units we are going to get for our money. I suppose that, the country over, the average B. t. u. content of bituminous coal, used for locomotive fuel, will be 12,500 per pound and that for oil this figure will be 18,500. Oil will weigh around 7½ pounds to the gallon and, on these bases, 180 gallons of oil carry the same number of heat units as does one short ton of coal. Relative boiler efficiencies must be taken into account, however, before any such comparison is of value and, from the best test figures I have available it appears that, with coal, we can look for a combined efficiency of about 62.5 per cent, while with oil this figure becomes in the vicinity of 75 per cent. With due consideration of these relative figures the equivalent heat value of the two fuels in question becomes 2000 pounds coal equals 150 gallons of oil. Oil-burning railroads have used, in reporting to the Bureau of Railway Economics, relative figures ranging all the way from 90 to 168 gallons of oil as being equivalent to a ton of coal and the American Railway Association has recommended, that in order to establish a uniform basis for comparison, a standard equivalent figure of 160 gallons to the ton be established and used by all roads so reporting.

The matter of locomotive boiler

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HEATING THE HOME

Radiant Heat Relative to Oil Burning Furnace Design

Radiation as a Method of Propagating Heat Compared With Conduction and Convection

H. W. COLLINS*

OF the three methods of propagating heat, viz: convection, conduction and radiation, the last is the most effective and seemingly the least heretofore considered in the design of domestic oil burning furnaces. There is a great deal more radiance incident from an oil fire than from a coal fire since the latter is often rendered ineffective by banking.

Have Depended on Convection

It has been the tendency of the manufacturers of coal furnaces to depend largely upon the method of convection. The hot gasses from the fire passed through long flues, often returning several times before leaving a furnace. The extent to which this process could be carried was limited by the draft developed by the chimney as found in the average home and the willingness of the owner to clean the deposits of soot and ash dust from them. Since many oil burners operate with mechanical draft, the process of convection has been carried on to an even greater extent in the oil burning furnace.

The accumulation of soot or lamp black, so characteristic of an oil fire, on these surfaces which are not exposed to the radiance of the fire greatly affects the efficiency of the furnace and necessitates their frequent cleaning. This is a very dirty, unpleasant task, not at all in accordance with the fundamental idea of oil burning—cleanliness—and one which the owner upon purchasing the oil heating equipment supposedly has rid himself of forever.

There has been a great deal of controversy between the oil burner manufacturers and the manufacturers of oil burning furnaces as to which one was responsible for this condition.

Air Increase Causes Haze

In general, as the proportion of oil to air is increased, so do the flame temperature and combustion efficiency until a light haze is emitted from the chimney. If the proportion is increased above this point, the mixture becomes too rich and the result is a smoky fire and lower flame temperature and combustion efficiency.

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* Research Bureau, Majestic Company, Huntington, Ind.

However desirable it is to have a clean, smokeless fire, it would seem unreasonable that the burner should never soot or smoke, since just a trace of smoke is the owner's best evidence that it is working with the most economical adjustment. Likewise, at this point the chance of getting soot are greatly increased, so it would seem ridiculous to design a furnace which is rendered ineffective or partially so under these conditions.

When radiation is incident on a body, part will be reflected, part transmitted and the remainder transformed into molecular motions which we call heat. The rays incident upon a body may be of many periods of vibration, each having different wave lengths, ranging from long, invisible ones at low temperature, and increasing in lengths up through the visible ones, dull red, red, etc., to white, above which they are still shorter and invisible ranging from white to ultra-violet. Most bodies absorb only part of the energy of the waves of all periods. Lamp black is the best known absorber and also the best known radiator. It absorbs about 98 per cent, transmits none, and reflects 2 per cent of all the rays incident upon it.

The importance of the relative value of radiation, conduction and convection as means of utilizing the heat generated by the oil burner entitles it to more attention than it has received. It seems a question to be considered along with getting good combustion, ignition, installation, etc. Hence, Mr. Collins' pertinent article should open a new topic for beneficial discussion. Radiation, as he sees it, is naturally the most effective of the three and is aided by some of the peculiar characteristics of the oil burner.

Soot Not An Insulator

With the burner operating at its maximum combustion efficiency without giving off excessive smoke, there will be deposited on all the surfaces which see the fire a very thin, closely adhering coat of lamp black, except possibly in an oven heated warm air furnace or on a fire pot made of refractory material, under which condition these surfaces are so hot that the gases are not chilled to the point at which lamp black is deposited. This thin layer never builds up to a greater thickness than 1/32″ for, since none of the rays are transmitted and only 2 per cent are reflected the other 98 per cent is absorbed thus raising the lamp black to kindling temperature, and it constantly burns off to approximately this thickness.

Below this thickness, the rate of conduction is such that the radiance is conducted away fast enough to keep the thin layer below kindling temperature. Briefly, this sooty layer insolates itself to the kindling

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Oil Fuel in Small Heating Plants

Giving Some Charts Showing Efficiency of Heat Absorption In Furnace and Boiler

By Walter J. Ottinger

THE requirements for successfully using liquid fuel in small heating plants, are as follows:

The supply of fuel must be ample and dependable. The equipment must be:

a. Absolutely dependable, under service conditions.

b. Efficient and economical. Power requirement should be as small as possible, likewise the consumption of fuel, gas an electricity, consistent with results.

c. Simple in construction, easily understood, with few adjustments and the smallest possible number of moving parts.

d. Must operate at high sustained efficiency.

e. Must be clean, operating without smoke, soot, odor or spilled fuel.

f. Must be absolutely safe, under all conditions. Preferably should be approved by The National Board of Fire Underwriters, and the installation itself should have the approval of the local fire prevention authorities.

g. Should have automatic control, so that any desired temperature or pressure will be maintained, regardless of weather conditions.

h. Must be quiet in operation, at least to such an extent as not to disturb members of the household.

i. Must be thoroughly well designed and tested, thoroughly engineered, so that the user will not be caused the inconvenience of doing the experimental work which should have been done by the manufacturer before the device was placed on the market.

j. Must be rugged and fool proof, with moving or adjustable parts enclosed, so as to protect the burner, and the user as well, against tampering.

k. Must be backed by a competent service organization, prepared to answer emergency calls on short notice, at any time. This presupposes an agency well manned and financially responsible.

Stationary Nozzle Type Burner

First we will consider the stationary nozzle type of burner with no integral combustion chamber. The burner itself is very simple in construction and operation, but with the moderate pressures compatible with safety in domestic installations, the atomization of the fuel is likely to be incomplete. Then to get thorough mixture it is necessary to admit a high excess of air. This effect, together with the necessity of cutting down the heat absorbing area with firebrick, results in high fuel consumption.

The rotating nozzle burners are comparatively simple in construction and operation, give thorough atomization and consequently require a much smaller excess of air

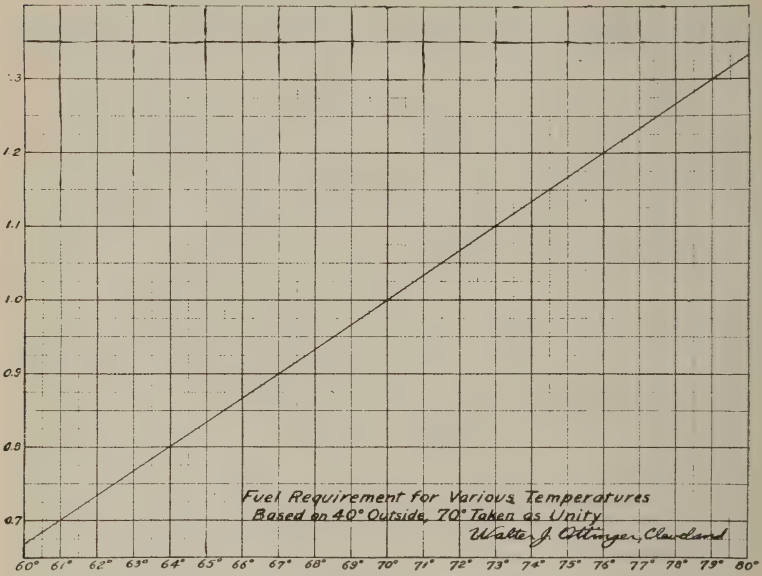


Figure 1.

to get complete combustion. They respond readily to small adjustments of both air and oil supply, such as automatic control by steam pressure or by expansion thermostat. These burners were not originally designed for use with pilot light and electric thermostat control, and they are not so well adapted to off-and-on control as other types with integral combustion chambers. The principal disadvantage of the rotary nozzle burners is that the intensity of their flame requires bricking in, with consequent loss of valuable heat-absorbing area.

Where the combustion chamber is integral with the burner the flame is combined and controlled, and the burner can be so placed that the full effect of the radiant heat is secured. Uniformly thorough mixing of oil and air is secured, regardless of the shape of the furnace. There being no bricking required, the full efficiency of the largest possible amount of heating surface is obtained and maintained. As the combustion chamber is comparatively small, it is rapidly heated, so that with automatic off-and-on control, there is the smallest possible efficiency loss in starting from a cold furnace.

The severe service of the combustion chamber makes it necessary to find a material capable of withstanding excessive expansion and contraction without warping or cracking. In some burners fireclay chambers are used, and the service which these

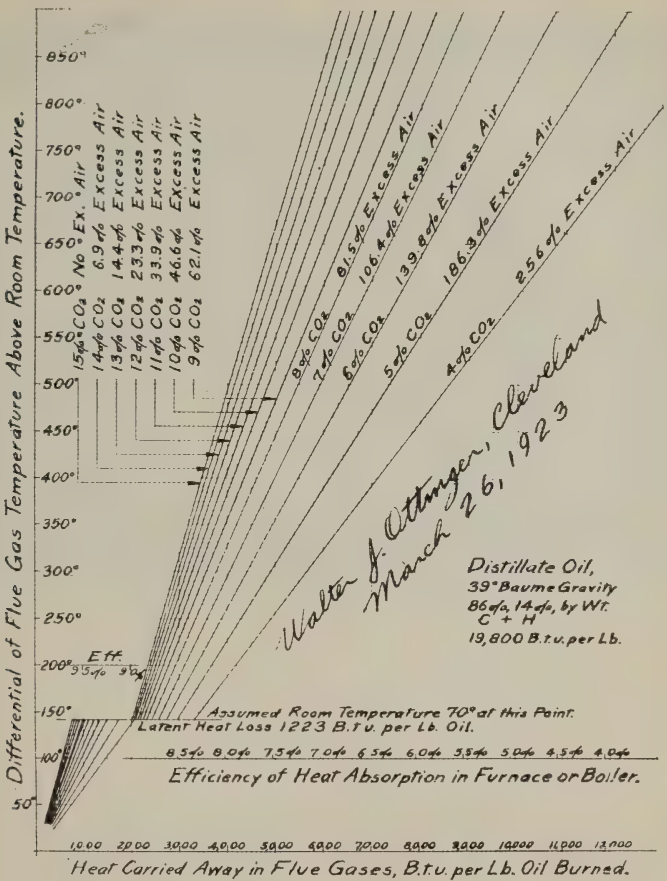


Figure 2.

give depends partly upon the frequency with which they are inspected. In others metal combustion chambers are used. Where a special alloy can be secured which will stand up to the work, there is no question about metal being the ideal material. It heats most quickly and it holds its shape.

Any solid deposits, due to improper setting or adjustment of the burner, impurities in the fuel, or other causes, will be made in the combustion chamber, from which they may be readily removed. In

(Continued on page 72)

Oil Burning Furnaces Used for Welding

This is a good close-up of one of the small oil fired furnaces used in many railroad blacksmith and boiler shops. They are especially suitable for welding jobs, particularly for pipes and flues in the boiler shops, and for quick heating jobs in the blacksmith shops. In this one a flue is being heated for welding. Larger furnaces of this same type are used for case-hardening and for bringing to a working heat the pieces too large for the average blacksmith's forge.

The heaviest fuel oil is used, and is forced into the furnaces, which are lined with fire clay, under very high pressure, together with a jet of air, also under high pressure. In most shops, where a large number of the furnaces are used, the oil is stored in one large tank and is piped direct to the furnace, with no auxiliary tank.

McKeel Company Purchases Peerless

The McKeel Oil Heat Company has purchased the oil burner manufacturing business of the Peerless Oil Burner Company of Chicago, including all patents and equipment. The headquarters of the McKeel company, which have been in Chicago, are being moved to Pittsburgh, Pennsylvania. M. M. Chesrown, head of the Peerless Company, has retired from the oil burner business.

FUEL OIL MARKETS

Fuels and Distillates Are Firm With Good Demand

THE fuel oil market remains firm with prices at rather high levels, compared with the market of sixty to ninety days ago. As far as can be foretold at this writing, indications are for continuance of prices at about their current levels.

Heavy Oil At Ninety Cents

A price of ninety cents is described as the bottom of the market for the heavy fuel oil. As to the top prices, it was possible to place orders through such channels as are selling fuel oil, just short of a dollar a barrel for the 24-26 gravity. The fact that numerous regular sources of fuel oil are not now selling or even offering fuel oil at any price is having a sustaining force upon prices.

Demand for kerosene and the distillates is strong enough to maintain steady markets for these grades at firm prices. Prices are ranging 4⅞ to 5 cents for 41-43, and 5 to 5⅛ for 42-44 kerosene. Distillate prices have been ranging around 3⅝ to 3¾ for 36-38 gravity and 3⅞ to 4 for 38-40. Unless quite mild winter weather over a large territory should ensue there is little outlook for any material decline in these prices.

Reports indicate a much larger use of fuel oil in Middle Western industrial sections than ever before, and a large number of inquiries from industrial and railroad sources indicate continued purchases on quantity basis for the near future. There is little surplus of fuel oil. One of the leading buyers is the Smackover region is reported to have shipped 300 carloads of fuel oil to Chicago recently for industrial use alone. It is regarded as hightly likely that more of the Smackover crude will be diverted into the industrial regions of the United States because of the fact that negotiations looking to an increase in production in Mexico have been completed and that Smackover crude probably will not be called upon to such an extent as a substitute for Mexican crude.

Domestic Consumption Higher

Regarding the domestic use of burning oils, this is increasing quite rapidly and jobbers on the whole are reported following up inquiries with orders. In most cases there appears to be no actual scarcity of tank cars at this time.

The tendency on the part of distributors of oil for use in domestic burners is to reduce their grades of oil to a minimum, to eliminate trouble of stocking half a dozen gravities. This tendency, if carried out to a sufficient degree, may affect the whole situation and may even have an effect on burner design. Standardization of burner fuel is greatly desired in the oil and burner industries.

Current Tank Car Prices

The following prices in tank car lots, f. o. b. Group Three refineries or adjusted to that basis, were quoted as of October 20, shipment in sellers' tanks:

Fuel oil, 24-26 gravity, low sulphur, bbl.......	$.90 -.95
Fuel oil, 26-28 gravity, low sulphur, bbl.......	.92½-97½
Fuel Oil, Smackover, bbl.	.90 -.92½
Gas oil, 32-36 gravity, gal.	.02¾-.02⅞
Distillate, 36-38 gravity, gal.	.03⅝-.03¾
Distillate, 38-40 gravity, gal.	.03⅞-.04
Kerosene, 41-43 gravity, gal.	.04⅞-.05
Kerosene, 42-44 gravity, gal.	.05 -.05⅛

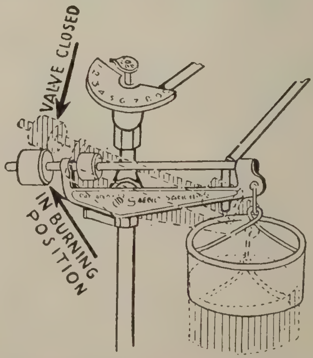
Federal Gauge Shows Increase

The Federal Gauge Company, Chicago, manufacturer of control devices for oil burners, reports an increasing volume of business. Every month since June has registered an increase in business over the increasing month, according to T. W. Owens, sales-manager.

Signet Valves *for* Oil Burners

Signet Safety Valves and Signet Thermo. Valves
work by gravity
No Springs or Ratchets
Union Angle Needle Valves
furnished with dial and index hdl.
All Valves Tapped for ¼-in. I. P.
Manufactured by

Crampton Farley Brass Co.
221 Main St.
Kansas City, Mo.



CONSULTING DEPARTMENT

Q. Being a reader of your magazine we are taking the liberty of seeking your advice on a problem that has so far proved quite baffling to us.

We have a core oven, inside dimensions 10 ft. wide, 12 ft. deep and 8 ft. high, arranged with tracks for two core cars and having shelves on three sides for drying small cores. In the ceiling of this oven there is a ventilator 16 in. in diameter which is regulated by a damper and which enters into a stack about 30 ft. high. We have been heating the oven with 28 gravity fuel oil, put in through two burners under a blast of from 18 to 20 ounces. These burners are arranged on a level with the floor and combustion takes place in two chambers running the depth of the furnace and 14 in. square inside dimensions. Heat, theoretically, rises from the chambers into the oven through graduated openings left in the fire brick which forms the top of this combustion chamber.

We have tried every conceivable type graduations and have closed up the top and discharged the heat through the side, but so far have had only limited success. It takes us three hours to raise the temperature from 110° to 425°, although the bricks in the two combustion chambers burn out from the intense heat caused in this part of the oven. Once having reached 425 we can shut down one burner and maintain this heat by alternately shutting off and starting up the other burner. We will appreciate any suggestions you might have to offer.

D., Clinton, Ia.

Ans.—It would seem to us that if the burners were properly installed it would be possible to raise the required temperature in 1½ hours at the most. The fact that the heat is not distributed evenly although the bricks in the combustion chamber are melted indicates that the heat ports and vents are not properly proportioned and do not distribute the heat over the entire space. Our advice is to write to every industrial burner manufacturer whose address you find in **Fuel Oil's** advertising pages, describing your trouble and sending a blue print of the oven, and asking them if they can remedy your trouble.

Q. We are interested in the installation of fuel oil forges in our blacksmith shop and would like to have any information or lists of manufacturers who make a specialty of this equipment. We do not want anything on rivet heaters nor plate furnaces. H. E. G., Quincy, Mass.

Ans. Fuel oil forges for use in blacksmith shops can be obtained from: Mahr Manufacturing Co., Minneapolis, Minn.; Kellogg Manufacturing Co., Rochester, N. Y.; and probably from the Aeroil Burner Co., Union Hill, N. J.

Q. Will you please give us the names of the oil burners which have been approved by the Underwriters' Laboratories? W. K. H., Richmond, W. Va.

Ans. The oil burners that have so far been approved by the Underwriters Laboratories, and their manufacturers, are as follows:

Arrow, made by Socony Burner Corp., New York City. Baker "Model F," made by Baker Steam Motor Car and Mfg. Co., Pueblo, Col. Caloroil and Caloroil Type A, made by Caloroil Burner Corp., New York City. Electrol "Type S," made by Home Appliance Corp., St. Louis, Mo. Johnson Type 22, made by S. T. Johnson Co., San Francisco, Cal. Kleen Heet Type G, Winslow Boiler and Engineering Works, Chicago, Ill. Lillibridge "Types 38—D, 68—D, 99—D, and 9-11—D," Lillibridge Heating Corp., Hutchinson, Kan. Nokol, American Nokol Co., Chicago, Ill. Oil-O-Matic "Types D, E, and F," C. U. Williams & Son, Bloomington, Ill. Oliver "No. 20A," Oliver Oil-Gas Burner Co., St. Louis, Mo. Quinn, Quinn Oil Burner Corp., Port Richmond, Staten Island, N. Y.; Globe Rotary, Pennsylvania Globe Rotary Co., Philadelphia, Pa.

Q. Has centrifugal filtering for waste oils been found satisfactory.—C. C. H., Columbus, Ga.

Ans. Centrifugal filtering has been found to be a quite satisfactory method of removing waste material from fuel oil, but it is impractical in the case of domestic burners, because it would add too great an expense.

Q. Kindly advise me whether or not the Worthington Oil Burner, manufactured in Kansas City, has been approved by the Underwriters Laboratories.— T. K. G., Natchez, Miss.

Ans. The Worthington burner had not been admitted to the approved list at this writing.

Based On a Different Principle

NEW PROCESS OIL BURNER

By a shortened chemical process gas oil or distillate is converted into city gas, instead of cracking the oil into ethylene and acetylene. City gas will burn as low as 600° F. Ethylene requires 1600° F. The hydrogen of the acetylene explodes with a series of explosions, causing the roar, and drops the carbon.

The CARY NEW PROCESS OIL BURNER no more requires gravity or artificial power draft than does a gas stove.. 81% heating efficiency with 15.1% CO^2 are not uncommon.

Silent. Not less noise—no noise. No mechanical parts to wear out. The price is very reasonable.

Every CARY dealer says business is good.

CARY & COMPANY

Cary Bldg. Minneapolis

Oliver Company in New Hands

Complete change in ownership and official personnel has been announced by the Oliver Oil-Gas Burner Company, St. Louis, Mo., the business having been purchased by W. H. Schaefer, a St. Louis business man, T. J. Flynn has become vice-president and general manager: G. S. Miekle, former director of research, is now associated with the General Oil Burner Company, Detroit, Mich. The future plans of B. M. Oliver, who has resigned the presidency, a position he has held since the organization of the company, are unannounced.

Peabody Ships Burners

Shipment of a carload of combination oil and gas burners to the Southern California Edison Company has been announced by the Peabody Engineering Company, New York City. Another carload will be shipped in December, officials of the company say.

Philadelphia to Burn Oil

Complete oil burning equipment has been installed to furnish heat and power in the Philadelphia, Pa., City Hall. The city purchasing agent estimates that the yearly saving made by substituting oil for coal will amount to $30,000 a year.

Four hundred barrels of fuel oil, bunker "C," are used by the Panama Canal yearly to fill its various heating requirements, it was revealed by a recently issued request for bids on contracts to furnish a year's supply.

Your Tank

must be chosen with the same care as your burner. *The best burner in the world gives trouble unless the tank is its peer.* Butler-built tanks are the complete complement of a *good* burner.

Butler Horizontal Welded Fuel Oil Tanks are made in 8 sizes, from 555 to 3155 gallons, of tested 10, 12 and 14 gauge steel. They are made of black steel, with bottoms re-inforced with copper steel, a durable, rust- resisting alloy. Fittings furnished with each tank.

Write now for catalogue and complete information on Butler - built tanks.

Two convenient factories

Butler Manufacturing Company,

Kansas City, Mo. **Minneapolis, Minn.**

U.S. GAUGE CO. N.Y. GAUGES U.S. GAUGE CO. N.Y.
PRESSURE—VACUUM

All sizes and types for every purpose.

Service our Solicitor

U. S. GAUGE CO.
308 W. Randolph St.
Chicago

44
Beaver St.,
New York

Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers". It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York

Branch Offices in the Larger Cities

Nebraska Firm Appoints Dealers

The Lansing Silo Company, Lansing, Mich., has been appointed a dealer for the Sun Automatic Oil Burner, according to a recent announcement by the Heat Equipment Corporation, Lincoln, Neb., manufacturers of the Sun. Other appointments announced include the Oil Heating Equipment Company, Kansas City, Mo.; Warner & Stewart Company, Cincinnati, Ohio; Rochester Heat Equipment Company, Rochester, N. Y.; Kentucky Consumers Oil Company, Louisville, Ky.; J. H. Symonds, Westfield, Mass.; and the Sales Corporation, Richmond, Va.

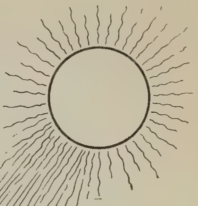
Describes Paul Pumps for Oil Burner

"Paul" type oil pumps are described in the most recent folder distributed by the Fort Wayne Engineering and Manufacturing Company, Fort Wayne. This is a revolving, reciprocating pump with a double acting piston of positive displacement. When used in a gravity system of oil supply, the "Paul" is controlled by means of a float switch and which keeps the oil level in the tank between fixed point. It may be placed independently of the tank or mounted in connection with the tank.

R. P. Flower has resigned as manager of the oil burner division of the Gill Manufacturing Company, Chicago, according to information from the Gill Company. His successor is E. E. Waifield.

"Marvel"

the burner de luxe



Heats for Less Than Coal.

Has Low Installation Costs.

Price is Lower

Heats More Efficiently.

Simple Construction.

Automatic Control.

Standard Parts.

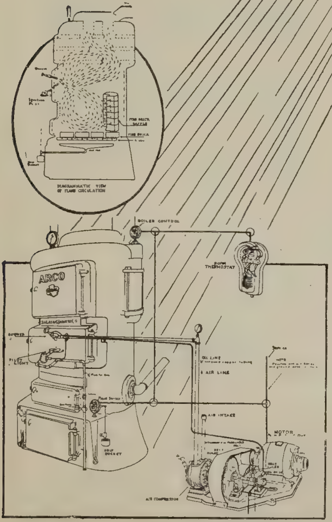
The "Marvel" requires but little service

Here is an opportunity for a man to engage himself for life in a business of his own. We have some exclusive territory open.

Merchants or Ex. Merchants

It will pay you well to investigate our offer

Write today for details



Marvel

Oil Burner Co.

711 Washington Blvd.
CHICAGO, ILL.

New Gravity Burner on Chicago Market

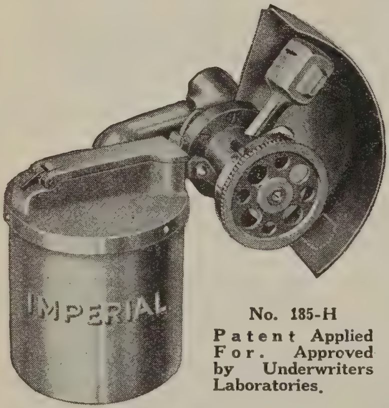
The Hannebohle gravity oil burner has made its appearance at Chicago. It is made in several sizes for both domestic and industrial use by the Hennebohle Company of South Chicago, Frank Hennebohle being head of the company and designer of the burner. The burner is said to have several new features, and patents have been applied for. Robert E. Ehrgott has taken the agency for distribution of the burner in Cook County, Illinois.

New Oil Tank Introduced

A square tank for use with domestic oil burners is being introduced by the Oil Products Appliance Company, Maywood, Ill. It is said of the square tank that it is economical of space required and that it is strongly reinforced on the interior. A. E. Davenport, for several years superintendent of construction for the sales department of The Texas Company, recently was made president of the Oil Products Appliance Company. Eastern representation will be handled by the Farr Hydraulic Systems, Inc.

Under the title "All for One and One for All," the September issue of the *Tank News,* published by the Milwaukee Tank Works, Milwaukee, Wis., carries a very good editorial on some deplorable business and political conditions, giving the causes and the remedies.

IMPERIAL OIL CONTROL AND SAFETY TRIP VALVE



Positive in operation, easy to install and meets all service demands better than any other valve.

Other Imperial Oil Burner Specialties are:

Safety Trip Valves
Indicator Valves
Oil Strainers
Shut-off Cocks
Needle Valve Drain Cocks
Copper Tubing
Oxygen Carbon Burning Outfits
Brass Pipe Fittings
Tubing Couplings
Angle and Globe Needle Valves

No. 185-H
Patent Applied For. Approved by Underwriters Laboratories.

Write for catalog giving complete information about prices, sizes and installations.

IMPERIAL BRASS MFG. CO. 1224 W. Harrison St., Chicago

Light It and Forget It

The Bear Automatic Oil Burner answers the demand for something better than the coal method in domestic and small industrial plant heating and gives the owner a uniform temperature in his building with the least possible attention, dirt and inconvenience.

Three safety devices are built in the Bear Burner, insuring the system against any emergency.

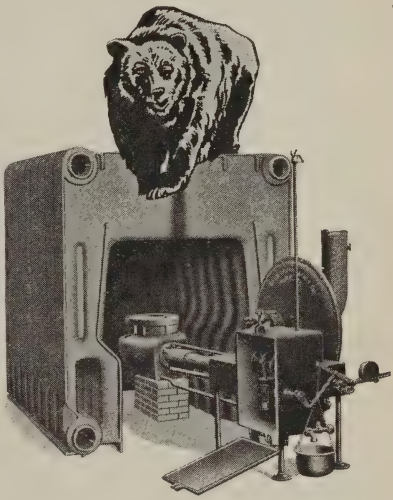
Pilot light burns constantly, using exactly same oil as the Burner. There is no gas connection, thus insuring absolute reliability.

There are absolutely no carbon deposits.

No alterations to the present heating plant are required.

Practically perfect combustion guaranteed.

Automatic electric control on all Bear Burners is furnished by the Minneapolis Heat Regulator Company.



Fire Pot, Heat Diffuser and Baffle are all made of a special alloyed metal which is guaranteed to stand up under the extreme temperatures. This, the heart of our system, contains the best material that can be bought for such service.

The Bear Burner is a Reliable, Durable, Automatic and Efficient Oil Burner, and can be installed in any style Coal Burning Furnace. It is Made Right and Sold Right.

Bear Combustion Co., Inc.

York, Pennsylvania

Western Fuel Oil to East by Water?

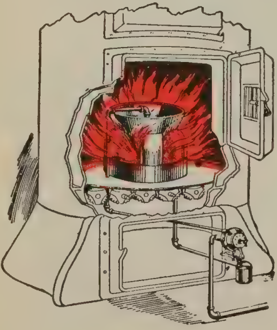
Shipment of several cargoes of fuel oil from west coast ports with destination unannounced has given rise to the report that these may be headed for eastern ports where the fuel oil could be shipped into interior parts of the United States, in the same way that gasoline has been shipped in "over the heads" of the inland refiners the last two years.

An Error

A report contained in the August issue of **Fuel Oil** of the outcome of the Federal Gauge Company-Absolute Contactor Corporation suit, in which it was stated that the former company won the suit, was in error.

The Absolute Contactor Corporation, of Beloit, Wis., brought suit against the Federal Guage Company, of Chicago, and the Arcless Contact Company, alleging that these companies had appropriated to their own use certain secret processes which were the property of the former corporation. The Federal Guage Company filed a counter suit against the Absolute Contactor Corporation for unfair trade practices. After the trial the judge dismissed both bills.

Arrangements are being made to manufacture and market the Chalmers Oil Burner in Europe, according to recent reports. A large European firm has obtained permission to use the Chalmers patents and design.



The Burner You Have Waited For

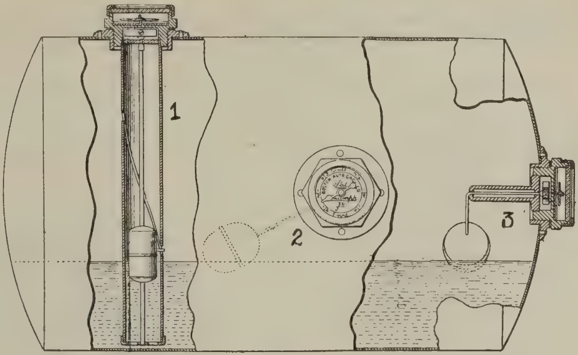
Don't experiment; seven years proved success

A burner that combines reasonable price with efficient, dependable service. Only moving part is a hand controlled fuel valve. No huge service costs to eat up your profits.

Think of the market such a burner has!

Our sales plan will interest responsible dealers. Write for it.

Worthington Burner Co.
1322 McGee St. Kansas City, Mo.



1. Triumph No. 26 O. B. Upright Gage, shown in section.

2. Triumph Jr. No. 41 Gage, applied to side of tank.

3. Triumph Jr. No. 41 gage, shown in section applied to dome of tank.

"*Triumph*"

Magnetic Oil Tank Gages

are

Durable -- Dependable -- Safe

The indicating pointer on all models of the "Triumph" is a compass needle which is revolved by the turning of a magnet under a solid diaphragm. This makes the gage absolutely safe for use below the level of the fluid, for even if the glass becomes broken there is no opportunity for either the fluid or fumes to escape.

An actual test by the Underwriters' Laboratories showed that a pressure of 1500 *pounds was necessary to cause a rupture of the diaphragm.*

Eighteen years of gage manufacturing experience have gone into the perfection of this gage.

Write for details of Model Jr. No. 41 and Model 26 O.B. which are special designs for oil burning equipment and are listed as standard by the Underwriters' Laboratories.

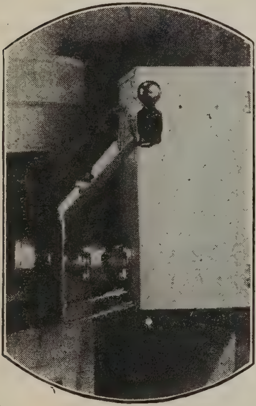
Boston Auto Gage Company
248 Boylston Street Boston, Mass.

The Much Talked of "Summerheat" Automatic Fuel Oil Burner Is Ready

The "Summerheat" DeLuxe

THE "Unit Package" that the oil burner industry has awaited, designed for simplicity, economy and dependability — completely automatic —low voltage non-sparking electric ignition—no gas—burns all grades fuel oil and kerosene—perfectly atomized oil burns slowly in suspension—instantaneous thermostatic safety control. The flame is sprayed into the furnace rather than blasted into it.

One size fits any domestic heating plant and performs equally well in hot air, water or steam plant. Flame length adjustment range from 4 inches to 4 feet. Fuel capacity of 1 to 5 gallons per hour depending upon size of heating plant.



This allows use of same machine in small pipeless furnace or large water or steam plant.

To increase flame length and heat intensity a simple lever is provided which works exactly the same as the gas lever on your car. The increased flame length and heat intensity is secured by the same principle as used in increasing the speed of your car and the volume of oil and air is determined by adjustments of the oil and air supply, the same as the carburetor on your car—as you increase or decrease the flame length the percentage of oil to air is automatically kept constant. The "Summerheat" may be controlled as to heat intensity in the same manner as your car is controlled as to speed. In addition "Summerheat" is completely automatic.

There is no pressure pump or other complicated mechanical equipment. The motor (1/65 H. P.) runs normally at only a fraction of its rated speed (the same as your automobile) and draws less than 100 watts of current. Average installation requires *less* than two hours. "Summerheat" swings with feed door and does not require removal of grates, no pot inside the furnace. You *do not* dismantle the heating plant to install "Summerheat." Allows garbage burning or coal fire without disturbing "Summerheat." No special wiring and no auxiliary electrical controls to service. Works directly off 100 volt house circuit either D. C. or A. C. any cycle being completely *universal*. Can be installed through ashpit door when necessary.

Regular installation (as illustrated) consists of drilling 1¼ inch hole in door and bolting on "Summerheat." This work is done in our shop. Then when the door is put back on its hinges your "Summerheat" is installed. The oil hook-up consists of connecting flexible metal lined hose to oil line or tank in the same manner as attaching garden hose to your hydrant. The electric hook-up consists of screwing plug in the ever-present basement socket. Flexible BX cable to "Mercoid" room thermostat completes the *automatic* hook-up.

"Summerheat" is a tested heating device and is fully guaranteed; beautifully finished in white enamel or aluminum and lists retail at $395.00 complete with "Mercoid" room thermostat and flexible metal lined hose. A *real* discount to distributors and full *territorial* protection.

May we suggest to you the importance of rereading these specifications that you might compare them with *all others.* Surely "Summerheat" has instantly set a new standard in oil burners. Those firms who have been waiting for the right oil burner to come along can now vindicate their caution.

Special Caution

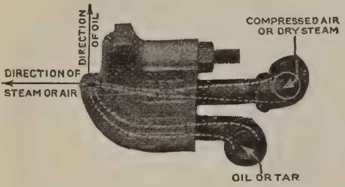
Kindly include in your request for details a bank and business reference. Territorial allotments will be made to qualifying distributors in the order received. Quick action will insure early delivery of demonstrator. Wire, then write.

Electromatic Appliance Corp.

Hamilton, Missouri

W. N. BEST

Oil Burners

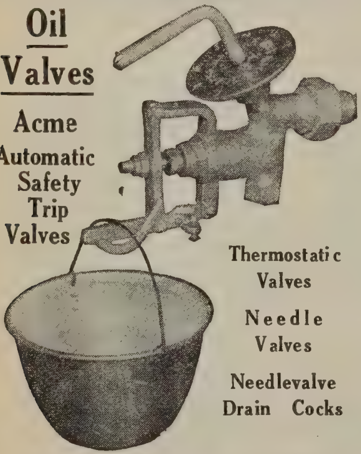


The BEST since 1890

W. N. BEST Corporation
11 Broadway New York City

Oil Valves

Acme Automatic Safety Trip Valves



Thermostatic Valves

Needle Valves

Needlevalve Drain Cocks

Acme Brass & Machine Works
609-611 East 17th St. Kansas City, Mo.

Chalmers Uses Novel Plan

A novel aid to merchandising his burners is employed by C. H. Chalmers, president of the Chalmers Oil Burner Company, Minneapolis, Minn., who has obtained in one large list the signature of the owner of every Chalmers Burner that has been installed in Minneapolis, testifying that each is satisfied with the burner and the installation. The date of the installation and the date the signature was obtained is also given.

Claims Non-Explosive Tank Cap

What is claimed to be a non-explosive valve and safety cap for tanks has been placed on the market by the Non-Explosive Corporation, New York City. Literature from the corporation claims the cap, by its peculiar construction, eliminates all danger of tank explosion due to heat or other natural causes when filled with oil or gasoline.

Another Burner for Arcola

With reference to an inquiry recently made of **Fuel Oil** as to what burners are made to be installed in an Arcola heater, G. O. Hofer, of the Atlas Oil Burner Company, Chicago, reports that his company's Atlas burner is adapted to that type of heater, and that several hundred of them have been installed.

Very complete and detailed booklets have been issued by the Protane Corporation, Erie, Pa., describing the Protane Bottled Gas Burners and allied equipment.

SUPER

AUTOMATIC OIL HEATER

Safe

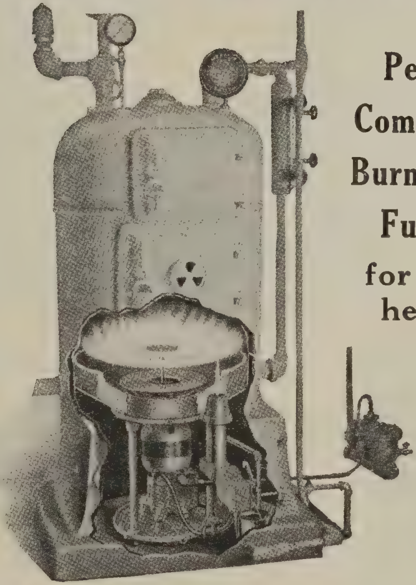
Durable

Low in Price

Perfect Combustion

Burns 28-32 Fuel Oil

for home heating



BALLARD OIL EQUIPMENT COMPANY

Largest Oil Equipment Service in the World

120 BROADWAY NEW YORK CITY

Distributors for New England, New York, Pennsylvania, New Jersey

LIVE AGENTS WANTED

Super Oil Heater Co., Mfgrs.,

Hartford, Conn.

Ryerson Crane Publish Folder

"Burn Oil—It's Better" is the slogan carried by a pamphlet that was published recently by the Ryerson Crane Company, Chicago, manufacturers of industrial oil burning equipment. Diagrams of installations of Crane burners and photographs of some of the equipment are shown in the folder also, together with some photos of homes and factories in which this burner has been installed.

Clay Better Than Cement?

It is claimed by some furnace and burner men that in preparing a hot air furnace for oil burners, whether gravity or automatic, fire clay can be used to much better advantage than ordinary furnace cement between the sections of the shell and other parts of the furnace in which a plastic, cementing material must be used.

Combustion Company Adds to Its Staff

The Combustion Engineering Company of New York and Chicago has announced that Axel Vohtz, formerly of Sweden, has joined its Hermansen furnace department in this country. R. L. Mann, formerly with the Tate-Jones Company, also has joined the Combustion staff. The company recently issued two new catalogues, one showing a new type of underfeed stoker and the other dealing with the Hermansen patent recuperator furnaces.

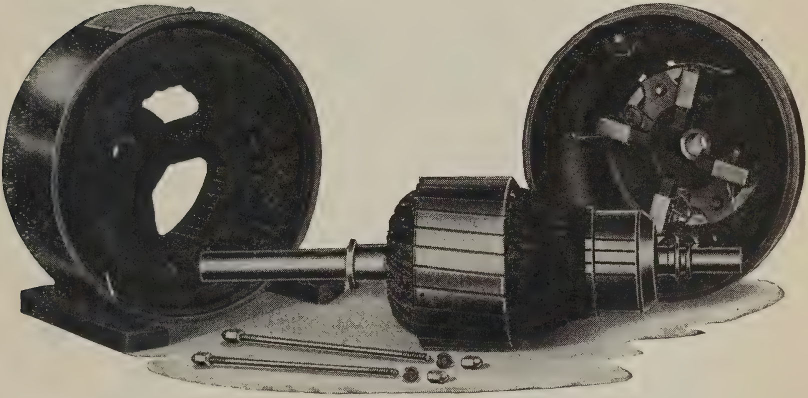
Truflame
Power Oil Burner

The burner that has the adjustable flame length and the six speed motor. Adaptable to any style heating plant. Manufactured in three sizes and selling at a price that the average home owner can afford to pay and yet filling every requirement and convenience found in the more expensive burners.

DEALERS.—Write for our discounts and literature.

Crescent Manufacturing Co.
Lincoln, Nebr.

A Motor that will win prestige for you



Janette repulsion-induction type of motor—note extreme simplicity.

It is a big statement—but a true one. No oil burner can be better than the motor that operates it. Think of the damage to the prestige of the equipment should the motor fail. A policy of having a reliable motor is recognized by manufacturers throughout the country.

Think it over, and write for our catalogue that will tell you why.

Janette Manufacturing Company
556-558 West Monroe Street
Chicago

PHILADELPHIA
439 REAL ESTATE
TRUST BUILDING

NEW YORK
SINGER BUILDING
149 BROADWAY

COOK

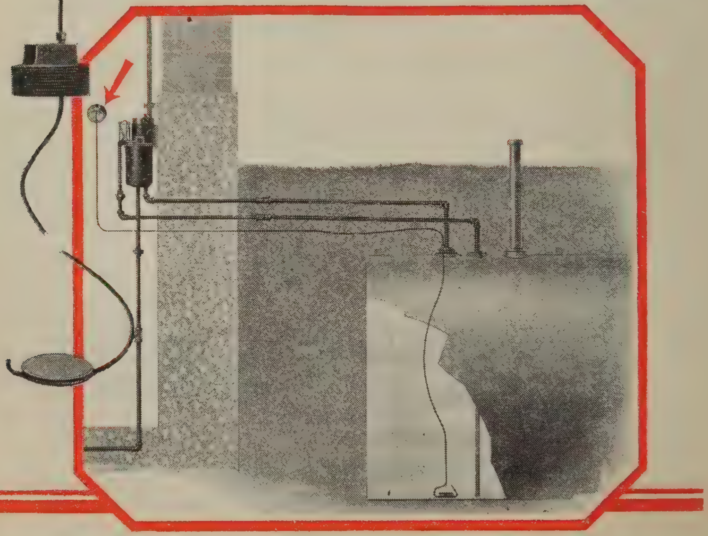
Hydrostatic Oil Gauge

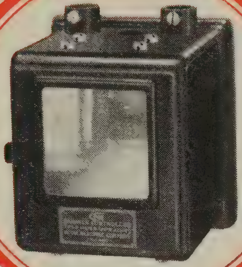
The Cook Hydrostatic gauge measures the quantity of the oil in either an inside or outside tank. It is operated by the pressure of the liquid on the diaphragms. This pressure is transmitted by a liquid in the small copper tube to the indicating gauge. To install, drop the operating diaphragms to the bottom of the tank through the 2-inch pipe hole. Insert the 2-inch reducing bushing that is threaded on the transmission tube and screw down the packing nut. This reducing bushing also provides a ½-inch hole for overflow or vent pipe. The gauge mounts 2 feet above the storage tank any place within the length of the copper tube. This hydrostatic gauge is strongly built, compact, accurate, and easily installed.

The gauge is made in 14, 25, 50, 75, and 100 foot lengths.

Write for illustrated folder and prices

Cook Electric Company, 2700 Southport Ave., Chicago





The Cook Controller is a simple and inexpensive device designed to control the operations of an oil burner. The Controller operates without a motor and can be used with any 110 volt thermostat, acquastat or pressurestat.

When the thermostat closes the circuit the cycle of operations of the Controller is as follows:

1. **Expands the gas pilot, closes oil valve if required, operates electrical ignition if used.**
2. **Starts burner motor.**
3. **Contracts or extinguishes gas pilot as required.**

When the thermostat opens the circuit the Controller produces the following operations:

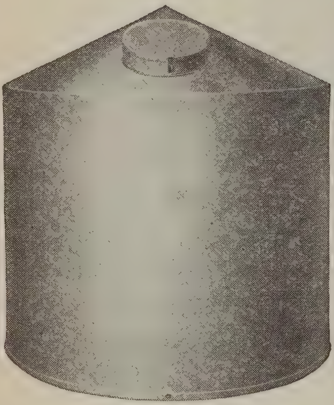
1. **Expands the gas pilot, closes oil valve if required.**
2. **Stops burner motor.**
3. **Contracts gas pilot.**

Should the current be cut off due to power failure, the Controller returns all parts to normal.

Folder, fully illustrated, upon request.

Cook Electric Company, 2700 Southport Ave., Chicago, Ill.

FUEL OIL TANKS



Vertical or Horizontal
65 to 35,000 gallons

Built by expert workmen. Tested under air pressure. Guaranteed oil tight. Immediate delivery. Write for prices and specifications.

Standard Steel Works

1606 Holmes Street,
North Kansas City, Mo.

AVOID THE OVERLOADED BOILER

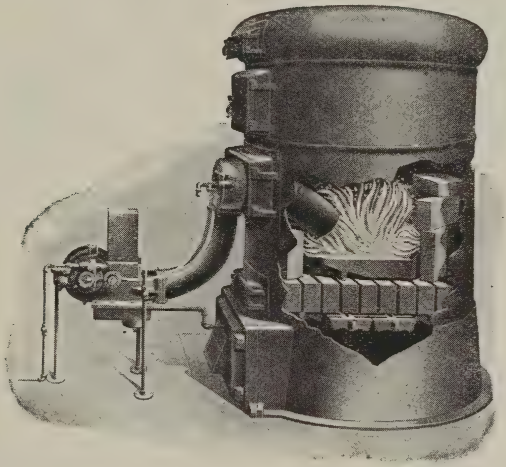
(Continued from page 11)

and the minimum of the next larger size burner, the larger should invariably be specified.

If the overall combustion efficiency of the boiler with oil as fuel is taken at eighty-five per cent, which is not uncommon with Nokol with 135,000 B.t.u.'s per gallon of oil, it is readily seen that it is necessary to burn enough oil to release the full number of effective B.t.u.'s demanded. Take, for instance, a hot water boiler with a capacity of 1,000 square feet. The B.t.u. releasing capacity of a boiler is found by multiplying the boiler rating which is given in square feet by the figure 240 for steam and 150 for hot water plants. In this case, this boiler would release at 100 per cent capacity 150,000 B.t.u.'s using the constant percentage of 17.6. To get the proper number of B.t.u.'s at 85 per cent overall efficiency, we find that 26,400 should be added to the figure obtained, giving a total of 176,000 B.t.u.'s. By referring to charts which have been issued we see that this release demands a consumption of approximately 2.4 ounces per minute, or approximately 1.3 gallons per hour, therefore demanding installations of our eight inch burner, insofar as demand for boiler is concerned.

Should Install Larger Burner

In cases where the total tax requirements demand installation of one size burner, and where the boiler B.t.u. requirements demand installation of a larger size burner, the dealer for ultimate satisfaction of



ELECTROL

Electric Ignition Quiet Operation

Scott-Newcomb System
The Automatic Oil Burner

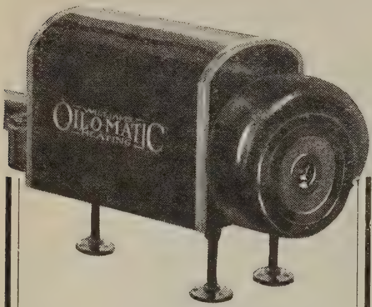
Positive Electric Spark Ignition

Quiet operation. Positive Pump Feed.
Four moving parts.
Air and Oil Separate—Not Integral.
Capable of definite adjustment.
Listed as Standard by Underwriters Laboratory.

Desirable unassigned territory available

HOME APPLIANCE CORPORATION
2818 LOCUST STREET ST. LOUIS, U. S. A.

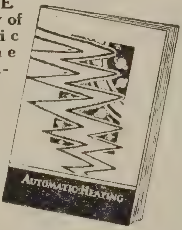
Member American Association of Oil Burner Manufacturers



Proved for 5 Years

Some desirable territory is still open for live dealers who can qualify as OIL-O-MATIC authorized representatives. No oil burner on the market offers so rich an opportunity. Nearly 20,000 in use and every single user satisfied. Burns cheapest fuel oil. Listed as standard by Underwriters' Laboratories. Easy payment plan. Big advertising campaign bringing in hundreds of prospects every day. Free training at the Williams Institute of Heat Research. Write today for full information.

SENT FREE
Ask for a copy of "Automatic Heating" the most remarkable booklet on oil burning ever printed. Sent free on request.



C. U. Williams & Son
Main Office and Plant
BLOOMINGTON, ILL.

Branches in all leading cities.

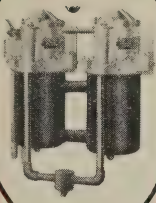
WILLIAMS OIL-O-MATIC HEATING

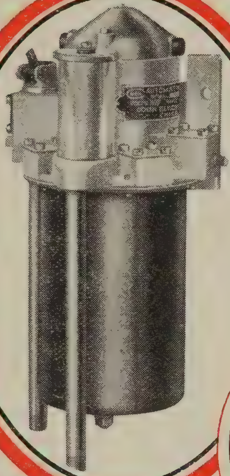
the user, as well as self protection, should invariably install the larger size burner. We may cite a few examples.

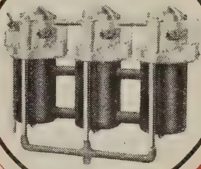
Take the case where the engineer's survey shows a steam boiler with manufacturer's rating of 1,100 square feet and a total tax of 522 square feet. Figuring on the B.t.u. releasing basis of the boiler, we find that 1,100 square feet, multiplied by 240 (number of B.t.u.'s per square feet) equals 310,664 B.t.u.'s. By reference to capacity chart we find that this number requires a consumption of approximately 4.1 ounces per minute, demanding installation of our ten inch burner, whereas the total tax of 522 square feet would require consumption of only 2.8 ounces, calling for installation of an eight inch burner. In this case, it was necessary that a ten inch burner be installed.

Uncovered Pipe Radiation High

In the instance of a steam job where engineer's survey shows a total tax of 563.55 square feet with uncovered pipes figured at 30 per cent of the standing radiation with a boiler rating of 925 square feet. As suggested previously, in calculation of this nature, we may use the percentage suggested in The Ideal Fitter by the American Radiator Company, of fifty per cent for uncovered piping instead of thirty per cent that has been used in the past. The standing radiation in this case was taken as 433½ square feet, and figuring on this basis we would have a total tax of 650.25 square feet. This would be equal to seventy per cent of the boiler capacity of 925







COOK

Automatic Oil Pump

Is a bellows type of pump that contains no packing.
It delivers oil to the burner exactly as required.
It is positive and reliable in its operation.
It is easily installed, noiseless and operates at a cost for current of less than 20 cents per 1,000 gallons.
Cook Automatic Pumps are manufactured in three sizes:

Single Bellows Pump, Capacity 20 gallons per hour.
Two Bellows Pump, Capacity 40 gallons per hour.
Three Bellows Pump, Capacity 60 gallons per hour.

Each bellows unit is operated by an individual motor as a separate pump.

Illustrated circular on request.

Cook Electric Co.

2700 Southport Ave. Chicago

square feet which is the proper relationship accepted in good practice. The total tax of 650 square feet demands consumption of 3.5 ounces per minute and, according to suggested practices, installation of a ten inch burner. The boiler capacity of 925 square feet figured on the B.t.u. releasing basis, as previously shown, gives 261,720, which requires a consumption of only 3.4 ounces per minute, or installation of an eight inch burner. In this case it is imperative that a ten-inch burner be installed on account of the total tax.

Let us take a hot water system with total tax of 900 square feet which requires total tax of 900 square feet, with consumption of 3.1 ounces per minute, or installation of an eight-inch burner. The boiler has a rating of 1,400 square feet, which will give us a total of 246,960 B.t.u.'s, requiring consumption of 3.25 per minute, also demanding an eight-inch burner. In that case an eight inch would be correct.

Means Excessive Operation

The effect of installing a burner in a boiler which has a load of seventy-five per cent or more will be much the same as installing a burner undersized or too small for the boiler and total tax, as well as if the building were under-radiated. In each case it would mean excessive operating periods for the burner, high oil consumption, insufficient heat during cold weather and at the same time it would have an injurious effect on the burner, particularly upon the combustion chamber. The result would be a dissatisfied owner who,

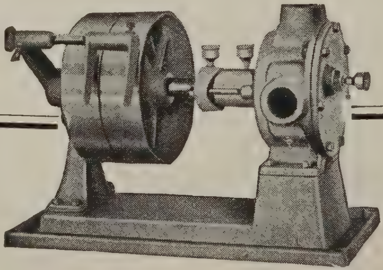
Steadier Delivery of Fuel Oil

The Oil burner performs no better than the regularity of oil delivery. The VIKING pumping principle assures the utmost of positive, steady oil flow and handles oils of every weight dependably. The Viking is guaranteed not to leak. Fewer parts give longer life and economy of operation.

Write for the Viking catalog.

VIKING PUMPS

VIKING PUMP CO.,
Cedar Falls, Iowa



Over 50,000 in use. Superior pumping principle has made this possible.

Send name today for new enlarged catalog picturing and describing the Viking pump.

although the burner would be doing all that possibly could be expected of it, would become a knocker creating sales resistance—not because of the burner itself, but because it had been placed in a heating plant incorrectly designed and proportioned, which should have been rejected as unsuitable for the burner. On the other hand, the relationship between total tax and boiler capacity may be properly proportioned. Due, however, to faults in heating plants, such as mains and risers of insufficient capacity, trapped returns, defective radiator valves, radiators pitched the wrong way or other defects caused by inefficient steam fitting, the burner would prove unsatisfactory unless these faults were brought to the attention of the owner and properly corrected.

Aeroil Burner Co., Inc.
Union Hill, N. J.
Manufacturers of
Portable Oil Burners for heating
Pitch and Asphalt Kettles
Oil Burning Asphalt Kettles
Lead Melting Furnaces
Kerosene Blow Torches
Good Sideline for Oil Burner Salesmen

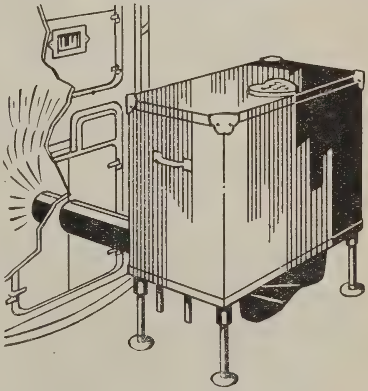
PETROMETER
Fuel Oil Gauges
Are adaptable to all Tanks
Price, $5.00 to $20.00
Porter Electric Carburetor Company, Inc.
Manufacturers of Gauges
35 Purvis St. Long Island City, N.Y.

A Carload of Oil Burners

One of the largest companies in the East, (name on request) engaged in the sale of Heating Equipment, recently placed an initial order with the Hart Oil Burner Co. for 100 Burners.

Engineers from this company finally decided upon the Hart Oil Burner because of its high efficiency, excellent mechanical design and rugged construction.

Designed and built by engineers with 34 years of manufacturing experience, the Hart Oil Burner is the last word in manufacturing progress. Some territory still open for agents.

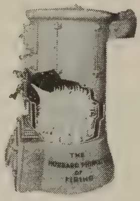


Hart Oil Burner Co. "HART HEAT"

Department 101 **Peoria, Ill.**

HUBBARD OIL BURNER

Hundreds of enthusiastic users in the great Northwest where the heating problem is a real problem.



There is some good territory in which we are not represented.

Write for our literature "What Users Say of Their Hubbard Burner"

HUBBARD AUTOMATIC OIL BURNER CORPORATION
MANUFACTURERS OF
Oil Burning Equipment

724 SECOND AVENUE SQ.
MINNEAPOLIS, MINN.

PROPER SETTING FOR THE OIL FIRED BOILER

(Continued from page 14)

The walls of the setting should be of common brick, of a good thickness and lined with fire brick or other refractory material. In most cases, and it is advisable in all cases, the boiler is carried on a separate structural support thereby removing its weight from the walls. The fire brick or other refractory is usually laid nine inches thick, with a header course every sixth course. This header course not only ties the lining to the outer wall, but permits repairs to be made to a section of the lining without taking out the entire lining down to the defective point.

The walls of a boiler should be air tight at all times and in some cases a metal case is placed about the setting to insure this. It is important that the walls are sufficiently thick and insulated to keep down the outside wall temperature in order to prevent loss as well as warpage of the metal.

Whether the boiler is supported by the walls or on separate supporting structure expansion must be taken into consideration. Many an otherwise good setting has developed a bad leak simply due to the oversight of this important point. The boiler should be so hung that its expansion will not affect the setting, that is, so that it will not move any part of the setting with it when expanding or contracting.

The boiler is supported directly

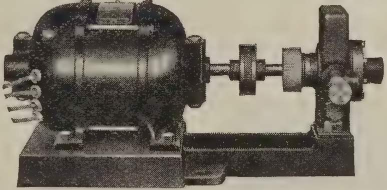
by one of two methods: brackets riveted on the shell and designed to rest on the wall, or corresponding brackets on the supporting members; or strap hangers riveted on the shell and designed to be supported from above on beams or other supports. In the case of brackets one pair of them should be provided with rollers to allow expansion without unusual stress in the supporting structure. Hangers should also be provided with a simple and effective means of movement.

The joint between the setting and the headers must be tight. This condition may be obtained by forcing asbestos packing between the top course of bricks and the header. The front and rear headers are further sealed and protected from the outside atmosphere by a large door on the front and rear of the setting. This facilitates the repairing of tubes and the installation of new tubes as required occasionally without taking down considerable brick work.

Byron K. Eaton, chief engineer for the Winslow Boiler and Engineering Company of Chicago, has returned to headquarters after a several week's business trip through the South.

Arrangements have been made by the Hammel Oil Burning Equipment Company, Inc., Providence, R. I., to become the New England distributors of the Hart Oil Burner, manufactured by the Hart Oil Burner Company, Peoria, Ill.

"PAUL" Type "RRO" Oil Pump



The "PAUL" Type "RRO" Oil Pump is a revolving reciprocating pump with double acting piston of positive displacement, the clearance is zero. It is positive in action, capable of working against high suction lifts, is perfectly balanced, noiseless in operation and will handle light or heavy oils. These are a few of the many features which make the "PAUL" Type "RRO" Oil Pump ideal for use in connection with domestic or industrial oil burner installations.

FORT WAYNE ENGINEERING & MFG. CO.
Home Office and Factory
FORT WAYNE, INDIANA
Ask for Bulletin No. 5030

RADIANT HEAT RELATIVE TO OIL BURNING DESIGN

(Continued from page 20)

temperature and is burned off from the radiant heat of the fire. It is not, however, self insulating to the extent that the rate of conduction is below that of cast iron or steel, since its formation is not accompanied by a rise in the stack temperature.

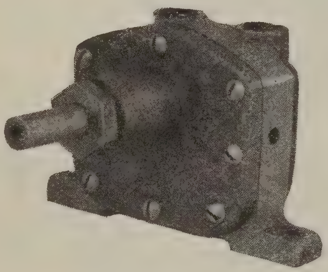
On the surfaces which are not exposed to the radiance of the fire the lamp black does not burn off to a closely adhering layer but continues to build up in soft, fluffy layers of lamp black and microscopic air cells. This formation will continue until the temperature in these passages is increased to the kindling temperature, due to its extreme insulating effect. In this event, the whole mass catches fire often resulting in a chimney fire, or if mechanical draft is employed, as these passages become smaller, the velocity of the gases is increased to such an extent that further formation will be prevented.

Frictional Gas Loss

If natural draft is used, even though the formation is accompanied by an increase in stack temperature, unless the passages are large, with plenty of free opening, the additional draft created by this increase is more than off-set by the frictional loss of the gases passing over this irregular fluffy mass. A falling off of the draft is accompanied by lower velocities through the burner, hence bad combustion, and the condition goes from better to worse. The efficiency

We Specialize on Domestic Oil Burner Pumps

Our type B pump shown here has the following distinctive features:



Guaranteed suction lift over 22-in. vacuum.
30 gallon per capacity of 1725 RPM.
Quiet operation at motor speed.
Simple yet durable constructions, oscillating type, with only three moving parts.
Larger sizes, up to 120 gal. per hour.

For Manufacturers

We will build to order to meet your special requirements.

Dealers and Distributors

We build small motor driven units for gravity or pressure burners, or for float switch operations. Write for prices.

Agents Wanted

Teesdale Manufacturing Company

320 Douglas Street
Grand Rapids, Michigan

The low pressure mechanical oil burner

THE Simplex Mechanical Oil Burning System for power plants combines low oil pressure and low air pressure—a feature seldom found in mechanical atomizing burners. This is made possible by the following features of the Simplex burner:

—the only burner made in two parts or less

—will atomize under 40 pounds pressure

—tips are hardened, insuring long life

—easily kept clean

—the simplest atomizer and burner made

Marine Engineers designed and perfected the Simplex System after years of experience at sea, where the most difficult requirements in the burning of oil for steam are met.

The result is a high grade mechanical oil burner with the following practical advantages: 1) a short, bushy flame, insuring a maximum of CO_2 gas at all times, without smoke; 2) low air and oil pressure; 3) complete combustion; 4) low stack temperatures; 5) high and constant CO_2 readings; 6) high boiler efficiency; 7) low cost of installation; 8) low cost of maintenance; 9) coolness of boiler room; 10) simplicity of operation.

Any ordinary fireman can get maximum results from the Simplex burner due to its simplicity of construction and operation. A saving in oil consumption has been achieved—amounting to 10% over any other burner with which the designers have had experience.

The Simplex Mechanical Oil Burner is made for either induced or natural draft.

Engineering Service

The Simplex Company also renders the following service:

1 Designing and installation of power plants or any part of them.

2 Furnace brickwork of every description.

3 We carry a full line of Draft Gauges, CO_2 Indicators, Electric Pyrometers, Steam Flow Meters, Flexible Oil Hose Connections and all combustion accessories.

The SIMPLEX FUEL OIL ENGINEERING CO. Inc.
11 BROADWAY ◦ ◦ NEW YORK

of the plant is then materially effected.

Soot Thought an Insulator

It is an established fact that soot is commonly thought of as an insulator to heat and therefore prevents its propagation. Upon surfaces which are not exposed to the radiance of the fire, soot prevents the conduction of the heat contained in the gases emitted from the fire through the walls of the furnace to the circulating medium outside. It does not, however, prevent the propagation of heating through surfaces which are exposed to the radiance of the fire. In fact, because of its property of absorbing radiant heat and the fact that it deposits on these surfaces in a closely adhering layer, it is very beneficial.

The writer appreciates the effectiveness of certain laws of convection for propagating heat from the flues of a furnace, but believes that it has been thoroughly demonstrated that these principles can be incorporated in the furnace design and still have all the surfaces exposed to the radiance of the fire, in which event the surfaces are rendered alieffective. They are exposed to a mass of radiant energy equaled by no other fuel. The hot gases are directed in accordance with the laws of convection and they are self-cleaning as well as doubly effective as heat absorbing surfaces.

J. C. Bogle is in charge of a Chicago office which has been opened by the Absolute Contractor Corporation, Beloit, Wisconsin.

Improved Rotary Type 22

This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—And Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

Main Office and Factory

S. T. Johnson Co., Oakland, Calif.

Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Paterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.

Write For

Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.

Every Installation Needs a Gauge
PNEUMERCATOR CO. INC. BROOKLYN N.Y.
TYPE H.T.I. TANK GAUGE PAT. MAR 9 1915
FT.

Satisfy Your Customer

by including a

Pneumercator Tank Gauge

in his oil burning installation. The gauge can be located anywhere and at any distance from the tank. It is simple to install and operate.

Write us—tell us your tank size and let us quote you.

Pneumercator Company, Inc.
40 Flatbush Ave. Extension
Brooklyn, N. Y.

FOR HOMES-SMALL BUILDINGS-FLATS

BURNER AND THERMOSTAT $190

ROYAL OIL BURNER

AUTOMATIC

BURNER $150 ONLY

IMPROVED 1925 MODEL
AUTOMATIC No. 4
F. O. B., K. C., MO.

Specifications

MOTOR—1-20 H. P.—Direct connected t fan.

CAPACITY—Steam radiation—700 sq. ft.
Water radiation—1100 sq. ft.
Furnace—up to 4 sq. ft. grate.

FUEL—Any gasoil—distillate or kerosene—36 gravity or higher.

FEED—Gravity flow to burner.

PILOT—Oil pilot fire automatically increased to high fire by thermostat. City gas not required.

WEIGHT—Boxed for shipment—150 lbs. Tanks not included.

Can be installed by any pipe fitter—complete instructions furnished—made in three sizes—Nos. 2, 4 and 5. Dealers in many cities.

Write for catalog. Some territory still open for exclusive dealers. Oil burner firms will find the Royal a quick selling, dependable addition to their line. We refer to Dun or Bradstreet or any Kansas City bank.

Willis W. Howe Co.
MANUFACTURERS
3030 McGee Trafficway
Kansas City, Mo.

August Fuel Oil Production A Record

Production of gas and fuel oils in the United States during August reached a new high record with a total of 1,167,211,159 gallons. This is an increase of 64,425,316 gallons, or 5.8 per cent, over the July figures. A record accumulation of gas and fuel oil stocks was on hand September 1, there being 1,658,670,957 gallons in storage. The increase of 52,719,473 gallons of these oils over stocks of the previous month reflect the increase in the production of crude oil. Domestic demand during August approximated 1,010,000,000 gallons, exact figures not being available. This is but a slight increase over July. Exports of fuel and gas oil rose sharply during the month.

Doherty Company Announce Merger

The Combustion Utilities Corporation, New York City, which was acquired by Henry L. Doherty & Company during March, this year, has announced the consolidation of the personnel and activities of its appliance and industrial furnace departments with those of the Surface Combustion Company, Inc., also of New York City. The greater organization, continuing under the name of the Surface Combustion Company, Inc., will be the Utilization Division of the Combustion Utilities Corporation. Henry O. Loebell continues as president of the Surface Combustion Company, E. E. Basquin as vice-president and E. M. Doig as secretary.

NIAGARA OIL METERS

Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.
2926 Main St.
Buffalo, New York

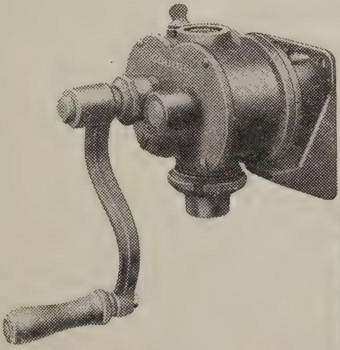


Fig. 1742

GOULDS

Hand Rotary Pump for Fuel Oil Systems

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings for handling distillate.

Furnished with bracket for attaching pump to side wall. This is a big improvement over the type that depends on pipes for support.

Capacity—10 gallons per minute.

Note:—We also have a complete line of motor driven pumps for the same services.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. Seneca Falls, N. Y.

Airoil Burners

"are efficient"

The Complete Design and Installation of Oil Burning Systems

National Airoil Burner Co.
916 Thompson Street
Philadelphia

WE SPECIALIZE IN

FUEL OILS
GAS OILS

FOR DOMESTIC OR INDUSTRIAL PLANTS

DELIVERED EITHER IN TANK TRUCKS OR TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

OHIO REFINING COMPANY
TELEPHONE RIDGE 884
CINCINNATI, OHIO

Johnson Issues Catalog

A lengthy and well illustrated catalog of the Johnson system of temperature and humidity control has been issued by the Johnson Service Company, Milwaukee, Wis. Thermostats, sylphon bellows, time clocks and other control appartus for every type of heater installation are included in the Johnson line.

New Oil Fuel On Market

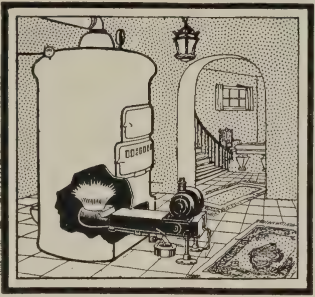
A new oil fuel known as Protane Bottled Gas, produced by the Protane Corporation, has been placed on the market. It consists of elements taken from natural gas produced at oil wells, purified, mechanically treated and bottled for domestic use as a stove fuel. It is used through special appliances.

French Fuel Wants To Rise

According to Captain Paul Vaschetto, of the French Navy, France's present naval consumption of 1,000,000 barrels of fuel oil yearly may be expected to increase to 6,000,000 barrels yearly within ten years, if the Navy's intended building campaign is carried out.

New Gravity Burner Out

Another new gravity burner, known as the "Meteor" has been placed on the Chicago market by the National Oil Heater Company. Bulletins issued by the company point out the folly of tying up cash in a coal pile, comparing the old method of "laying in" the winter's supply of coal in one huge pile with the practice of buying oil anywhere and any time, without extra preparation to receive it, as is often the case with coal.



Electric Ignition of Oil Burners

Another Kleen-Heet Triumph

Successful electric ignition, has been condemned by competitors as impossible of attainment.

They figured without Kleen-Heet engineers.

Kleen-Heet guaranteed its electric ignition, the same as its gas ignition. Today thousands of users testify to its practicality, its freedom from trouble, its efficiency and economy.

Another Kleen-Heet triumph!

How It Works

Kleen-Heet electric ignition is a reliable, simple device contained in a removable drawer. It consists of a small Bosch magneto which transmits an electric spark to a point approximately six inches back of the firepot.

Air from the pump and surplus oil from the automatic valve meet at this point and a small primary fire is immediately created. This starts the main supply of oil flowing into the firepot, and the furnace begins to heat the house.

KLEEN-HEET ELECTRIC IGNITION

rounds out a complete line of automatic oil burners.

Kleen-Heet

NO LABOR · NO COAL · NO ASHES

Winslow Boiler and Engineering Co.

General Offices: 208 South LaSalle St.

Chicago

Oil heat for the smallest bungalow to the tallest skyscraper

SIMPLICITY
and
ECONOMY

These are two of the big reasons why Chalmers Oil Burners are gaining in popularity every day. Tests at the experimental engineering laboratories of the University of Minnesota by disinterested engineers show an average C. O.$_2$ of 12.78%.

Every feature of the Chalmers Oil Burner is built up from standardized units — guaranteed to be free from defects of material or workmanship for a period of one year from date of installation.

Correspondence with substantial parties looking to permanent affiliations is solicited.

Write us on your letter head.

Chalmers Oil Burner Co.
Minneapolis :: Minnesota
Member American Association
of Oil Burner Manufacturers

Buffalo Fuel Oil Tanks Are Leakproof

Backed by a National Reputation and Years of Experience. Horizontal or vertical; sizes for any oil burner.

Write today for attractive prices and Bulletin No. 212.

GUARANTEED FOR FIVE YEARS
BUFFALO TANKS
MADE BY
Kaustine Company Inc.

KAUSTINE CO., Inc.
Manufacturers & Engineers
BUFFALO, N. Y.
Nationally known as the manufacturers of Kaustine Septic Tanks.

Direct Oil Fired Heater Meets Problem

A typical factory heating and ventilating problem has been overcome in the sheet metal works of the R. R. Hayward Company, Chicago, with the installation of a direct oil fired heater. In factories of this type, due to the great amount of dust in the air and the large open spaces that are hard to heat and easily allow accumulation of dead air, the problem is often a very difficult one.

In this factory there are approximately 220,000 cubic feet of space. The building is one-story, brick, L-shaped, with a large percentage of window and sky-light area, has a thin roof covered with tar paper and is exposed on five sides.

A CcCann-Harrison Heater having a capacity of 16,000 cubic feet of air per minute, with a 100 degree rise, was installed. It occupies about 100 feet of floor space. It was necessary to make the stack reach only five feet above the roof to give perfect combustion. With coal it would have been necessary to build one at least eighty feet high.

Another saving by the use of the oil fired heater was the elimination of a basement, reducing building costs considerably. There is also a saving in fuel cost of oil over coal of about $3 a day.

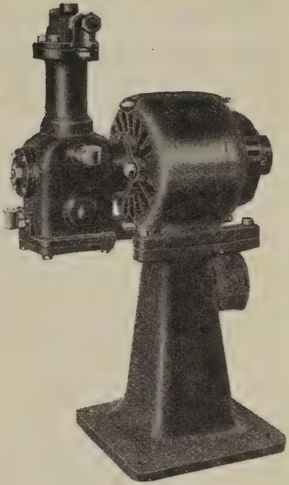
A new concern known as the American Heating & Oil Burner Company has been organized in Spokane, Wash., with a capital of $25,000. The incorporators are G. R. Clude, Ralph Lakin, and Fred Pye.

Insures Fuel As Required

Entirely Automatic,
No Priming Necessary
At Any Time, Easily
Installed, Noiseless,
Low Cost Operation

Write for Bulletin "H"

Monroe Machine Tool Company
737 W. Jackson Blvd.
CHICAGO



THE BASEL TYPE E-3 HEAT REGULATOR

is now equipped complete, with Thermostat, magnetic control, mercoid switch for operating motor, valve, automatic cut-off, of both oil and motor from overflow of oil to trip bucket, Thermostat control and automatic cut-off each being independent of the other.

Hand control independent of either the Thermostatic control or automatic cut-off.

Removable strainer, air seal, enclosed in steel case.

In fact everything in a nut shell. What more do you want? For Mechanical or Gravity Feed burners.

Basel line of valves and heat regulators are made in seven types. Two of which are approved and listed as standard by the Underwriters Laboratories of the National Board of Fire Underwriters.

All frictionless and packingless.

The Basel line of valves and heat regulators are not just ordinary valves. They mean advanced theories in Heat Regulators and Valves and Valve control construction.

Valves and valve control is our hobby. Literature on request.

911 Mulberry St. BASEL MANUFACTURING COMPANY Kansas City, Mo.

5 Gallons of Water Added to 500 Gallons of Fuel Oil Means Trouble

if the mixture reposes in your storage tank. It means that the heat value of the oil is lowered 13.14 B.t.u.; that combustion is likely to be less complete; and, when the temperature lingers around freezing, it means a layer of ice on the bottom of the tank that may spread the seams and clog the pipes.

Water creeps in in unknown ways. Test your tanks daily, and each tank car when it arrives, with the

Oil News Water Detector

It is a weighted brass rule upon which is fastened special detector paper. The rule is lowered into the tank, to the bottom, and the paper, which changes color when it strikes water, indicates the depth of the water there.

Price $1.00

Supply of detector paper sent with each detector

FUEL OIL
for Heat and Power
350 Madison Ave., New York City

OIL AND COAL AS LOCOMOTIVE FUELS

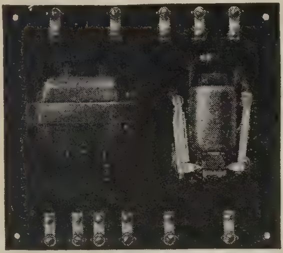
(Continued from page 16)

maintenance, when oil fired, is one that has been discussed a great many times and decided opinions have been expressed to indicate that oil shortens the life of the firebox, other opinions being as strongly stated that this is not the case and that no additional expense need be feared. Personally, I favor the latter view. I do not think that, especially if we base our figures on the actual work done by the locomotive, there will be any appreciable difference in boiler maintenance between oil and coal firing. It is understood, of coure, that a button head radial stay cannot be used with oil, it being necessary to put in countersunk head radials, driven flush. This is about the only change that may have to be made, if an engine is changed over from coal to oil burning, although it is also a good idea to use a few rows of hollow stay bolts at the bottom of the firebox behind the brick-work so that latter will not have to be removed when inspection is made.

Electric Light Helps

Firing valve arrangements must be simple, positive and well maintained. The fireman cannot do a good job if there is much slack between his operating handle and the valve plug. We find it of advantage to install a small, hooded electric lamp in front of the stack so that the rays will be thrown back over its top and enable the fireman to determine, at night, whether or not he is smoking the engine. All other

Thermostat Troubles Eliminated



Provision can be made for pressure-stat, pilot light or other control that may be used to supplement thermostat.

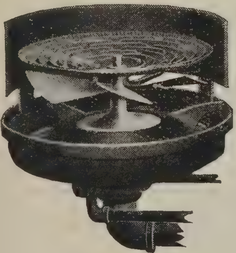
"Signal" Thermostatic Control Relays eliminate the "weak-link" in oil burner control by absolutely preventing arcing or burning at the thermostat contacts.

All panels have approved wiring, and clearly marked terminals, are rigidly tested and ready for external connections. They are supplied with or without housing, complete with wiring diagram.

Let us know your control problems. We will gladly submit a panel to meet your needs so that you can convince yourself of its dependability, efficiency and low cost.

Write for Bulletin A-40

SIGNAL
ENGINEERING & MFG. CO.
533 CANAL ST. NEW YORK, N. Y.



Rotary Oil Burners

Entirely Consumes the Fuel

There is no waste with a Rotary. The fan is propelled by water at a very high rate of speed. The oil is forced through small jets on to the fan and is broken up into a vapor. It is immediately consumed. The Rotary will take as low grade oil as 28 gravity. This means cheap fuel combined with perfect combustion.

There is a size for every need—Apartments, Hotels, Office Buildings and Homes—WRITE FOR DETAILS.

ROTARY MANUFACTURING COMPANY
1526 Santa Fe Avenue Los Angeles, Calif.
Eastern Manufacturer, 1934 Market St., Philadelphia, Penn.
Established 1908 Handled by distributors
Chicago, St. Louis, San Francisco, Oakland and others.

firing appurtenances, such as valves controlling the atomizer, blower, jacket heater, etc., should be conveniently arranged to hand as ease of operation is always conductive to good operation, tending to increase the percentage of the fuel money that we get back at the draw bar.

Some Changes Necessary

A good many roads have found it economical to convert a greater or less number of engines from coal to oil burning. This necessitates, of course, discarding grates, ash-pan, stoker, coal-passer and grate shaker (if present) and a portion of the smoke box included parts. As substitutes, there will be installed a fuel oil tank in the coal space of the tender, necessary steam and oil piping between engine and tender, fire-pan (brick lined), burner and its appurtenances, including controls, and also necessary work on firebox to adapt it for oil burning service. The cost of these alterations will, of course, vary as influenced by numerous factors. For large modern power we find the net cost of the change to be about $1,500 per locomotive.

It is not easy to determine exactly what will happen to operating costs if oil be substituted for coal. Fewer engines will be needed to handle a given tonnage or the same number can handle a greater tonnage. Locomotives can stay out of the house a greater portion of the time and long runs are possible that could not be made with coal. As an example of this last phase of the matter, the M.-K.-T. is running large Pacifics

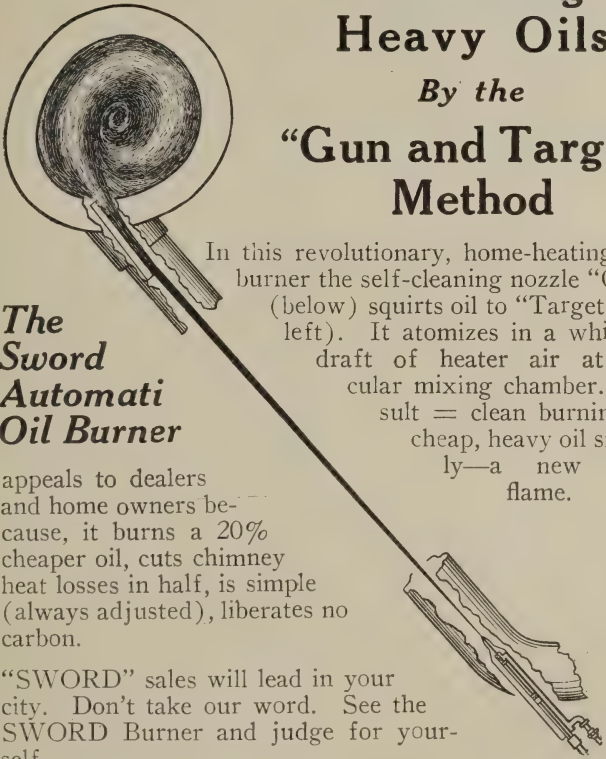
A Standard Size for Every Oil Burner
Known Everywhere for Their Quality

Established 1860 Incorporated 1907

SHARPSVILLE TANKS
65 TO 30.000 GALLONS
HORIZONTAL & VERTICAL

MANUFACTURERS OF
OIL EQUIPMENT

Sharpsville Boiler Works Co.
SHARPSVILLE - - - PENNA.



Atomizing Heavy Oils

By the

"Gun and Target" Method

In this revolutionary, home-heating oil-burner the self-cleaning nozzle "Gun" (below) squirts oil to "Target" (at left). It atomizes in a whirling draft of heater air at circular mixing chamber. Result = clean burning of cheap, heavy oil silently—a new type flame.

The Sword Automati Oil Burner

appeals to dealers and home owners because, it burns a 20% cheaper oil, cuts chimney heat losses in half, is simple (always adjusted), liberates no carbon.

"SWORD" sales will lead in your city. Don't take our word. See the SWORD Burner and judge for yourself.

Write for Full Information

Sword & Kimber Company
4861 Stenten Avenue
PHILADELPHIA, PA.

through in heavy fast passenger service from New Franklin, Mis. to San Antonio, Tex., a distance of 876 miles, five crews handling the engine. This has been in effect for several months and the results attained have been most satisfactory.

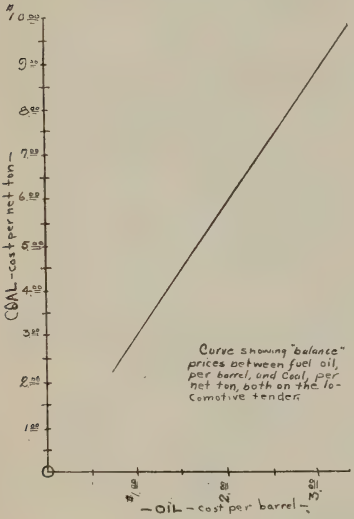


Figure 1.

For any railroad contemplating the possibility of a change-over from coal to oil or the necessity of changing back from oil to coal, the thing to be determined is the balance in price between the two fuels. With coal at $5.00 a ton on the tender, what price oil per barrel will develop the same amount of work, or with $1.25 oil how much should one pay for coal before seriously considering a change? The curve shown as Figure 1 will indicate, in a general way, where this balance will fall, it having been calculated on the basis of careful consideration of all factors involved. In making this up I have assumed coal with a thermal content of 12,500 B. t. u. per pound, while the oil was calculated at 18,500 B. t. u. per pound. Variation in these will, of course, vary the slope of the curve but it is believed, nevertheless, that it can be used as a reasonably good indicator, at least during any preliminary study, of the path best to be followed. It shows that, for all practical purposes, a price of oil per barrel one-third of that of the price per ton of coal, both fuels being on the tenders, is the balance point, that lower oil or higher coal would probably justify the use of oil and, conversely, if oil was higher or coal lower, that coal should be used. As I have already stated, this curve considers differences in boiler efficiency, in stand-by and other losses, etc., and can, I think, be used as direct reading for the purpose intended.

Desirability Is Unquestionable

I believe that no one will question the desirability of oil as a locomotive fuel if all question of relative cost be ignored and no voluminous defense of it for this purpose is therefore, necessary. Cost must, however, be considered as it is of paramount importance and the general relations between the ultimate costs of the two fuels under consideration is what I have tried to bring out. We, in the Southwest, find oil the "ecoeficient" fuel for our locomotive use.

J. D. Sayer, formerly well known in the gas equipment business, is now connected with the St. Clair Burner Corporation, St. Louis, Mo.

Oil Burning Locomotive Proves Successful

Exhaustive tests on the new type of oil burning, electricity-generating locomotive built by the Ingersoll-Rand Company for the New York, New Haven and Hartford railroad have been successful in every way, according to reports by the railroad's officials. The locomotive, which is a combination of the Ingersoll-Rand, American Locomotive Company and General Electric Company's inventions, burns crude oil and transfers the energy into electric power, thereby operating at a much lower cost than other types of locomotives can be operated.

The new locomotive easily handles a string of 95 freight cars with a total tonnage of 4,000 tons, a load that is only attempted by the largest of steam locomotives. It weighs 60 tons and develops 300 h. p. It is not unlike the present box car type of electric motor which is now in use on the railroad system. The tank carries enough crude oil for a full day's work.

The invasion of the oil burner into eastern territory where hydroelectric power is as cheap as in any section of the country may prove that the use of fuel oil is not limited to territory adjacent to oil fields.

Fuel Oil Exports Climb Sharply

During the month of September, 133,117,162 gallons of gas and fuel oils were exported from the United States as compared with 94,800,831 gallons during September, 1923, according to figures recently issued by the Department of Commerce. The value of the gas and fuel oil exports for September, 1923, was $2,713,346 and for September, this year, was $5,047,362. The total export for the nine months ended September 30, 1923, was 869,114,312 gallons, value $25,971,572 as compared with 1,083,444,211 gallons, value $36,664,753 for the same period this year.

Interesting Experiment on Pipe Covering

During some experiments conducted by the Warm Air Heating and Ventilating Society it was found that in covering a tin hot air conducting pipe in the basement with one thickness of asbestos paper, more heat was lost to the basement than if the paper had been left off altogether. It was found also that when four thicknesses were put on, still more heat was lost, and when seven thicknesses were put on the loss was still larger, but that when eight were used the result was as good and no better than when no asbestos was used at all. Beginning with the ninth thickness, however, each added one showed a better result and the heat loss decreased layer by layer.

One of the interesting exhibits at the recent International Petroleum Exposition at Tulsa, Okla., was a display of the Doreco oil burner that has been developed by the research laboratories of the Empire Companies, Henry L. Doherty interests, in Bartlesville, Okla.

Show Burner Is Not To Blame

In Minneapolis, Minn., where a local oil burner association has been formed, one of the duties of the secretary is to investigate all fires that are reported as "oil burner fires." The result has been to show that in more than four-fifths of these instances there has been nothing connected with the fire which would throw discredit on the oil burner.

How to Tell Faulty Burner

One method, given by James L. Breese, Jr., of telling whether or not a burner or the boiler in which it is installed is faulty consists of cutting a hole in the fire door and inserting a piece of pyrex glass. If the glass stays transparent, there is no need to worry. Another method is to paint the stack with white paint. If the paint stays white and stays on, the installation is alright. Examining the burner then consists solely of examining the glass and the stack for discolorations.

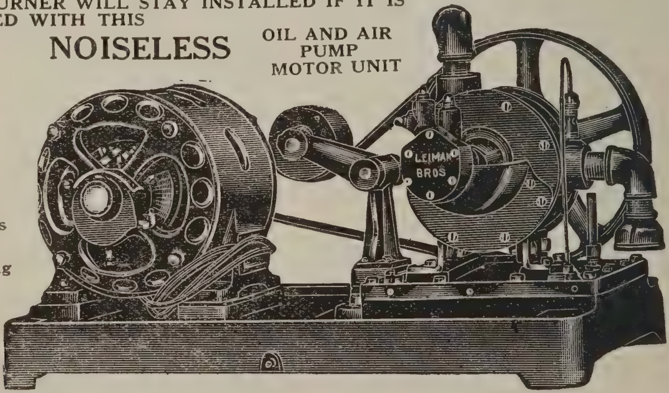
Regulations for the storage and use of fuel oil and for power and commercial type fuel oil systems have been approved by the committee drafting the proposed fire prevention ordinance for the city of Baltimore, Md.

The annual meeting of the American Petroleum Institute will be held this year in Fort Worth, Texas.

YOUR BURNER WILL STAY INSTALLED IF IT IS EQUIPPED WITH THIS

LEIMAN BROS. NOISELESS OIL AND AIR PUMP MOTOR UNIT

Many Sizes for All Sorts of Burners Non-Pulsating

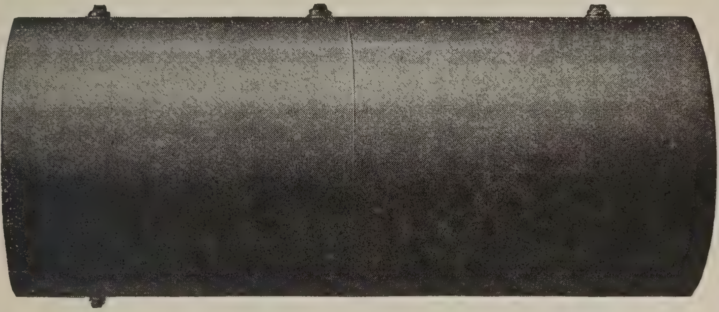


CONSULT US ABOUT IMPROVING THE OUTFIT YOU ARE NOW HANDLING BY SUBSTITUTING THESE EASY RUNNING, HIGH EFFICIENCY PUMPING UNITS.—Self-lubricating air pump, low-level oil alarm. Wear compensating. Hundreds are in constant service. Require very little attention. Endless belt drive with belt tightener, also direct coupled units. There is nothing that begins to compare with them and it will pay you to investigate them.

LEIMAN BROS., 60 Lispenard St., New York

Makers of good machinery for 35 years.

TRADE Leader MARK



The Logical Tank

For the Dealer Who Cares

If the burner is right and the tank is right then every installation will render quiet testimony to the integrity of the dealer who installed it.

Leader builds and guarantees quality tanks for every burner need. Of the thousands of tanks shipped out for burner use not one has ever come back.

Measuring gauges, vents, fill pipes, etc., are a part of our complete line.

Your order will be shipped immediately from stock.

Send for Special Bulletin and Price List No. 11

LEADER IRON WORKS, *Decatur, Illinois*
2118 N. JASPER ST.

OIL FUEL IN SMALL HEATING PLANTS

(Continued from page 23)

general this is preferable to carbon deposits on the heating surfaces; but in case of neglect it may become a disadvantage, in case excessive carbon deposits in the combustion chamber interferes with the flame and cause a "low fire" or as it is called, a "pot fire."

Natural draft oil burners are justified only by their low initial cost and their simplicity of construction. They are easily controlled by hand, and on the surface have the advantage of not requiring any source of power other than the chimney draft. They are, however, basically unsound in principle if the air is not proportioned to the oil, nor is the mixture "forced" to insure its being thorough. As a result, the fuel consumption is usually high, the burners smoky, and as they make a carbon deposit, they tend to "stuff up" and go out.

Most home owners, and some heating engineers, are somewhat hazy as to the relation between the temperature and the fuel requirements for any given conditions. To show the relations graphically the accompanying charts have been made up.

Show Heat Requirements

Figure 1 gives the relation of the fuel requirement to heat a house to various temperatures, to that needed to keep the house at 70 degrees. The outside temperature is assumed to be 40 degrees, which is about right for the North Central portion of this country. The owner can see at a

Oil Burner Castings

IRON AND BRASS UNFINISHED OR MACHINED

Various parts of oil burners require different qualities of iron for their particular use. Some require close grained leak proof or heat resisting qualities; some require soft iron for a large amount of machine work; some can be rough castings where finish is of no particular importance.

Our five foundries and machine shop insure you of our ability to take care of your requirements in every respect.

Chicago Hardware Foundry Co.
North Chicago, Illinois

Bird Oil Burner

Some Good Territory left for the right parties.

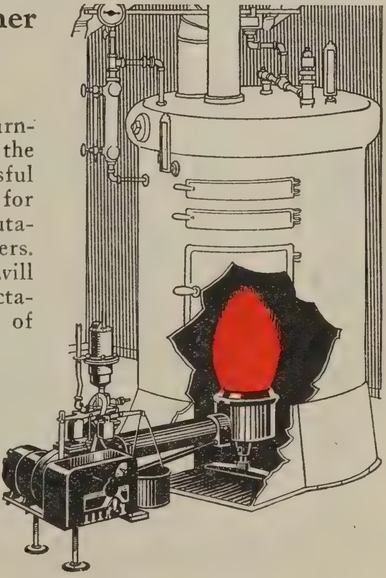
Three Years of Proven Success

A high class burner at a price one can afford.

Hundreds of Bird Burners are in use all over the country. Their successful operation has won for them an enviable reputation among home owners. It is a burner which will meet your every expectation, and assure you of satisfaction.

Write Today For Information

BIRD
BURNER CO.
Minneapolis, Minn.



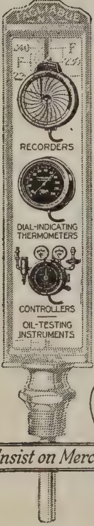
glance how much more it will cost him to keep his home at 75 degrees or at 78 degrees, or whatever he thinks he needs, than it does to keep the temperature at 70, which is plenty high enough.

Is Entirely New Feature

The second chart represents, I believe, something that has never before been worked out for fuel oil. Something similar to this has long been in use for coal, where it is assumed that conditions are the same as though pure carbon is being burned. While the chart has been worked out with the lighter distillates for domestic oil heating in mind, it will hold for all fuel oils with negligible error. The chemical make-up of all American fuel oils suitable for small heating plants is

TANKS
Electric Welded
Fuel Oil
Gasoline Air
Welded Pipes and
Pipe Lines
SMITH—HAMBURG—SCOTT
WELDING CO.
of N. Y., Inc.
Tank Plant
Marion St. and Harris Ave.
Long Island City
New York

Offices and Shops
505 West 57th St.
New York City



Safety in Oil Burning

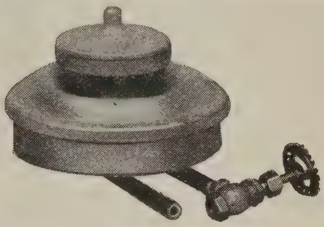
The TAG Shut-off Valve is connected in the fuel lines of oil burner equipped boilers and other devices and automatically shuts off the oil flow the instant that the stream or oil pressure used for atomizing falls below the required minimum. The TAG Valve LOCKS ITSELF and cannot be reopened (even though the atomizing pressure is brought up to the required point) until the trip lock mechanism is reset by hand. Absolutely prevents oil leakage into furnace and the possibility of a disastrous explosion. The TAG Valve is already in wide use for this purpose. Our Engineering Department will be glad to advise you on the application of this dependable protection to your large or small oil firing installation. Write for Bulletin F-468.

C.J. TAGLIABUE MFG. CO.
18 TO 88 THIRTY-THIRD ST., BROOKLYN, N.Y
Insist on Mercury Thermometers with the TAG-Hespe RED Reading Column
TAG TAGLIABUE MFG. CO. N.Y.
SINCE 1769

practically the same as that here used, so that the higher horizontal table, "Efficiency of Heat Absorption in Furnace or Boiler," can be used without change. The variation in heat content in the lighter and heavier oils can be taken care of by applying the ratio of the B. t. u. per pound of the oil under consideration to 19,800, to the lower horizontal table, "Heat Carried Away in Flue Gases, B. t. u. per pounds. Oil Burner." In this way the chart can be made to fit all oil burner installations.

Rapid and Accurate Method

The chart was originally made up with the object of supplying a rapid and accurate method of determining the efficiency of any oil burner and furnace or boiler combination, under



The "Superior"

New Invention. Combines Water, Steam, Air and Oil-Gas. Powerful White Flame. Gravity Feed. No Motors. Smokeless, Noiseless, Sootless. Low Price. Five Sizes, For Every type and Size Furnace, Boiler, Stove. State and Co. Agents wanted.

SUPERIOR OIL-GAS BURNER CO.
453 N. Racine Ave., Chicago

IT'S IN THE MOTOR

It is a fact that an Oil Burner can render no more satisfactory service than the motor which drives it.

The motor must operate almost continuously and usually without attention or regular oiling.

The Ohio Motor with its sturdy construction has for years satisfactorily met these exacting conditions.

Send for Bulletin No. 204.

THE OHIO ELECTRIC AND CONTROLLER COMPANY
5920 Maurice Avenue, Cleveland, Ohio.

LILLIBRIDGE
OIL VAPOR BURNER
Listed as Standard by Underwriters Laboratories
Tested by Iowa State College, Ames, Iowa, and proved highly efficient.
They last and satisfy.
Reliable dealers wanted
LILLIBRIDGE HEATING CORP.
Hutchinson, Kansas

WEBER BROS. METAL WORKS
Oil B Dept.
108 N. Jefferson St. Chicago, Ill.
Are equipped to make to your specifications metal floats, trip buckets, special sheet metal work, stamping and machine products.
Let us figure with you

KELLOGG
COMPRESSORS

Air Compressors.
Vacuum Pumps.
Special Oil Burning Equipment

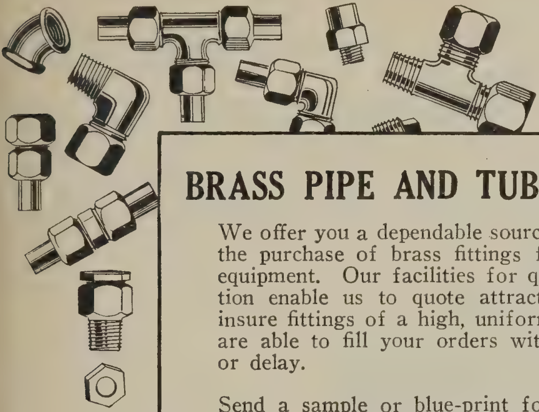
Our engineering and production departments are at your service in increasing your output of Oil Burners.

Send Direct
KELLOGG MANUFACTURING COMPANY
Rochester, New York

service conditions, with the least amount of trouble to either the owner of the equipment or the engineer making the test. It supplies the same results as a complete boiler test, at least so far as the owner is concerned, without the nuisance of breaking any oil, steam or water connections. All that is necessary to secure the data to determine the efficiency of any installation, is to drill two small holes in the flue near the boiler. In these holes are inserted a thermometer and an orsat apparatus. With the temperature and CO_2 readings and the room temperature, all necessary data is at hand. The best method, and one which must by its very nature be absolutely fair, is to use two recording thermometers and a CO_2 recorder and leave the instruments to record the performance of the burner for twenty-four hours or more.

Champion Issues An Insurance Policy

Clever advertising literature which consists of a folder printed in imitation of an insurance policy has been issued by the Champion Sales Corporation, distributors of the Champion Automatic Oil Burner in Kansas City, Mo. It is a home owner's insurance policy, the folder declares, insuring the owner and his family against bad health, discomfort, dirt, labor, distracting noises and waste of money. The Champion is an automatic burner of the "pot" type, the mechanism, motor and other, being housed in a compact group placed on a short stand directly in front of the fire door of the furnace.

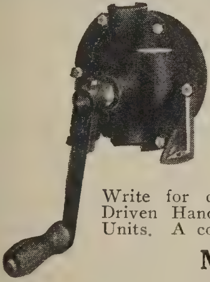


BRASS PIPE AND TUBE FITTINGS

We offer you a dependable source of supply for the purchase of brass fittings for oil burning equipment. Our facilities for quantity production enable us to quote attractive prices and insure fittings of a high, uniform quality. We are able to fill your orders without confusion or delay.

Send a sample or blue-print for estimates on special fittings made to your own specifications.

COMMONWEALTH BRASS CORPORATION
COMMONWEALTH AVE. & G. T. RY. DETROIT



M-D-Co. Pumping Equipment
for the Oil Burner Industry

To meet the problems as confronting the oil burner industry to such an amazing extent during the past few years we are prepared to furnish service and practical co-operation with this industry in all its phases.

Write for catalog describing Hand Pumps, Direct Drive Motor Driven Hand Controlled and Automatic "Mercury Control" Pump Units. A complete line to meet any range of application.

Mechanical Devices Company

CHICAGO OFFICE
549 W. Washington Blvd.
Phone: Franklin 2471

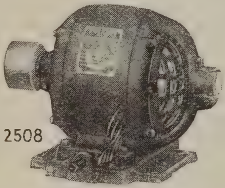
MECHANICAL DEVICES COMPANY

Eastern Office
325 Federal Street
GREENFIELD, MASS.

134 Fox Street *Main Office and Works* Aurora, Ill.

Emerson Motors

Single Phase, Polyphase and D. C.
(Interchangeable)



2 H. P. and Smaller

For thirty years we have specialized in producing motors in these sizes

The Emerson Electric Mfg. Co.

2018 Washington Ave., St. Louis, Mo.
50 Church St., New York City

(We sell no motors at retail or to the user)

BRN
QUALITY PRODUCTS

The B-R-N Electric Ignition Fuel Oil Burner

Saves the User from 25% to 33⅓% on fuel and from 50% to 75% on ignition costs.

Burns as low as 20°-22° gravity oil

The B-R-N suits any condition, home, industrial plant or apartment.

Write for dealers territory now

Blake-Raymaker-Nauman
1223 Michigan Avenue
Chicago, Illinois

Company Insures Burners For One Year

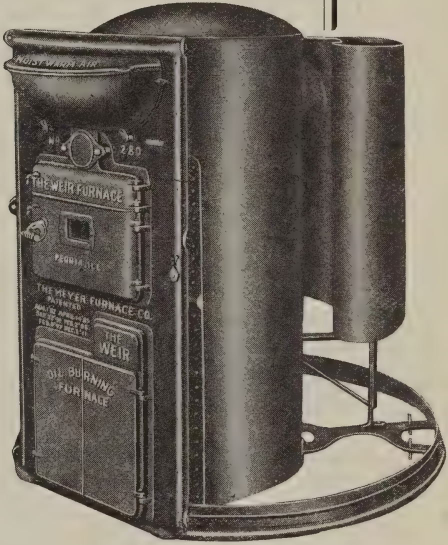
An insurance guarantee for one year against loss or damage on account of fire, or lightning, including theft, is made on the Super Automatic Oil Heater, according to a folder recently issued by the Super Oil Heater Company, Hartford, Conn., its manufacturers. The motor and pump are also guaranteed against breakdown for one year. The guarantee in both cases are insured by large insurance companies. This heater is of the automatic type and has numerous control features, including an automatic pilot light control. A rapidly revolving, vertical nozzle, which extends through and above a circular baffle plate that rests on or near the grate of the furnace forms part of the combustion apparatus. The nozzle is direct connected, at its lower end, to a 1/6 h. p. electric motor.

Enameling Company Saves With Oil Burner

The Economy Enameling Company, Quincy, Ill., recently completed the installation of oil burning equipment in their ovens, replacing coal ovens which had been in use for several years. The company, which makes porcelain enamel parts for stoves, requires that its ovens keep constant heats ranging from 1300 to 1600 degrees Fahrenheit. During the operation of the enameling process it is necessary to open the doors of the ovens at frequent intervals to take out old loads and put in fresh load of parts. With the old coal burning equipment it was found

The WEIR
Oil-Burning Furnace

the one
proven
warm air
furnace
for oil
burning



GET THE FACTS

Write

The Meyer Furnace Company
Peoria, Illinois

YOUR CONTROL PROBLEMS

Solved by

CON-TAC-TOR **Mercury Controls**

Dependable, Long - Lived, Eliminate Contact Troubles and Service Calls.

High and Low Voltage Room Thermo Switches, Boiler Safeties, Time Limit Switches, Magnetic Valves, etc. A complete Automatic Line.

ABSOLUTE CON-TAC-TOR CORPORATION
BELOIT, WISCONSIN

TANKS
For Fuel Oil

Capacities 260 to 10,000 gallons

Popular sizes carried in stock

The Boardman Co.
Oklahoma City

Write for Catalog and Prices

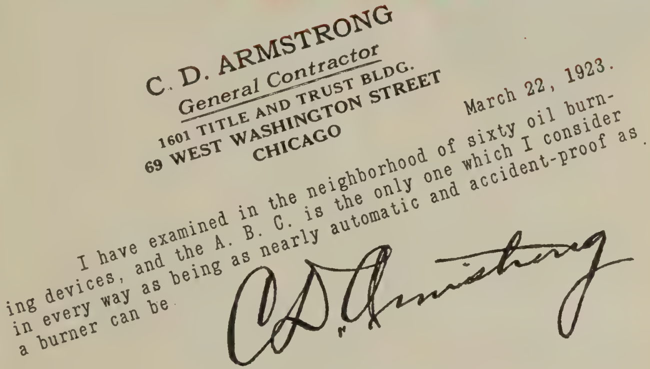
that the heat of the ovens would go down and a period of rest was necessary to get the temperature up again. With the new oil burning equipment the heat always remains at the proper temperature. Considering the fact that the plant is in operation twenty-four hours a day, six days a week, this has come to be quite an item. The management of the plant has found in addition to a greater output since the installation of the oil burners, that the product is better finished, that there is considerable saving in labor employed as no firemen are necessary, and that labor turnover has been reduced. Two other smaller plants in Quincy, both of which operate one oven only, have also installed oil burning equipment. These are the Quincy Vitreous Enameling Company and the George Meyer Company.

Minneapolis Describes New Equipment

Complete information on and description of all recent additions to their line of regulator equipment is given in a new catalog issued by the Minneapolis Heat Regulator Company. These include several motors and some thermostats. A new and useful idea followed in the preparation of this catalog resulted in its being made in the shape and size of ordinary letterheads to facilitate filing.

T. C. Thomas has been made superintendent of the Evanston, Illinois, plant of the Youngstown Sheet and Tube Company, heretofore having been superintendent of the company's machine shops in the Youngstown district.

Examined 60 oil burners — *bought an ABC*



C. D. ARMSTRONG
General Contractor
1601 TITLE AND TRUST BLDG.
69 WEST WASHINGTON STREET
CHICAGO

March 22, 1923.

I have examined in the neighborhood of sixty oil burning devices, and the A. B. C. is the only one which I consider in every way as being as nearly automatic and accident-proof as a burner can be.

C. D. Armstrong

Naked Merit Sells ABC

You don't have to be an engineer to understand ABC's leadership.

To start with, ABC's principle was correct. Three years ago a well known engineer said, "ABC is the only burner I have inspected that is fundamentally correct in design."

A couple thousand happy home owners know the engineer was right. Today ABC stands at the top—the modern oil burner.

Just consider these major advantages:

1. Quiet. 2. No carbon or soot. 3. Less oil required. 4. Longer boiler life. 5. Burns low gravity oils. 6. No fan or blower.

DEALERS WANTED

Let us tell you how you can make big profits as an ABC exclusive dealer. Write us today.

AUTOMATIC BURNER CORPORATION
312 May Street, Chicago

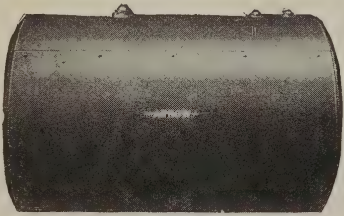
ABC OIL BURNER
no noise ~ no carbon

Sun Oil Burner

Experienced fuel oil dealers prefer the SUN because they can supply it both for low priced natural draft installation and when completely automatic power burner is required. It offers them more practical and proved selling points and is efficient and economical. Write for particulars.

Heat Equipment Corp.
134 So. 13th St. Lincoln, Nebr.

ARROW
Unconditionally
Guaranteed
Oil Storage Tanks



The Novelty Steam Boiler Works Co.
929 S. Howard St. BALTIMORE, MD.

OIL BURNING RESEARCH

(Continued from page 10)

which at first accepted them in many instances as any innovation is accepted. Notwithstanding the many failures which have resulted from the introduction of such a device by such methods, the American public in general is beginning to recognize the utility value of domestic oil burners. At the present time the volume of business is rapidly increasing. Unquestionably there has been much grief experienced by those encouraged to buy such burners. And yet there has been developed a sufficiently large number of satisfied users, or users who have been converted to the advantage of burning oil even though their experiences with particular burners have been unsatisfactory, to guarantee the permanency of the industry.

Domestic burners are here to stay and the number of installations will rapidly increase. It is very probable that due to the pressure of this demand the furnace manufacturer will modify his designs to provide for the more efficient adaptation of the oil burner. In subsequent issues of FUEL OIL the results of the author's research on domestic burners, extending over nearly a year's time, will be reviewed.

Several different types of gravity burners have been placed on the market recently by the Inter-State Oil Burner Company, Sioux City, Ia. This burner functions while resting on the grates of the furnace or stove, different sizes being made for each.

FUEL OIL

FOR HEAT and POWER

Devoted to developing and encouraging the efficient, scientific use of oil fuels.

Published Monthly

Vol. 3 December, 1924 No. 6

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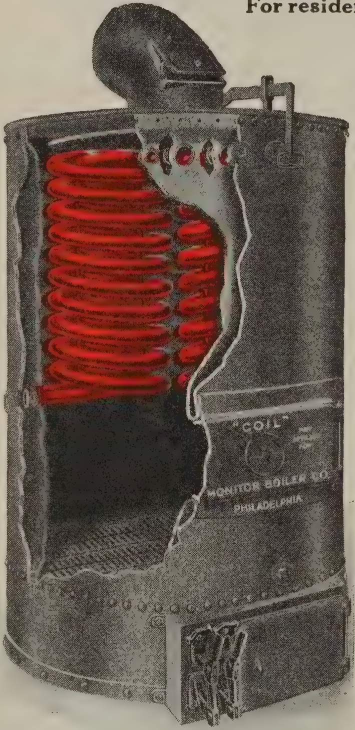

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Storing and Handling Fuel Oil in Industrial Plants*

An Expert Treatment of An Important Topic

By C. G. Sheffield[1] *and H. H. Fleming*[2]

THE equipment for storing and handling fuel oil forms an important part of the oil-burning installation, and a little time and thought devoted to the proper design and operation of such equipment is well repaid. For only in this way will continuity of operation be assured at the least expense for fuel oil and handling charges. The plant which is equipped to handle and store any grade of fuel oil in adequate quantities is in a position to take advantage of the fuel market and need not worry about temporary shortages of special grades of oil.

Storage tanks may be made of various materials and in various shapes, but the most common, and in general the most satisfactory are the steel cylindrical tanks, usually vertical except for small sizes, and with conical or dome roofs. Concrete tankage may be used for heavy oils, but is more expensive and requires very careful construction to avoid cracking.

Low Fire Hazard Underground

Underground storage has the advantage of low fire hazard, but otherwise has little to recommend it. A steel tank should never be placed underground where there is any danger of the water table being above the bottom of the tank, as water rising about an empty tank will either collapse it or raise it. Furthermore leakage is not readily detected cleaning is difficult, and water and sediment are not easily drawn from the tank.

The storage and handling equipment will depend somewhat on the nature of the fuel oil used. The oil in most general use for steam-raising purpose in the Atlantic Coast states is that known as Government "C" grade, which has a maximum viscosity of 300 sec. Furol at 122 deg. fahr. Storage tanks for this type of oil must be provided with heating coils so that pumping can be done at about 100 deg. fahr. In the Middle West, residual fuels of a lighter gravity and lower viscosity are widely used. While these flow freely at lower temperature than the "C" oil, some of them contain paraffin wax, which may make trouble by congealing in the lines.

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* Presented at the Annual Meeting of The American Society of Mechanical Engineers, New York, Dec. 1 to 4, 1924.

[1] Fuel Oil Dept., Standard Oil Co. of New Jersey.

[2] Ref. Engr., Standard Oil Co. of New Jersey.

Sufficient Capacities Required

A plant should have sufficient storage capacity so that during the period of greatest consumption the tanks will not be emptied between deliveries, allowing for the maximum delay that may be encountered in obtaining fuel. Tank cars are made in various sizes, those in the fuel service ranging from 6,000 to 12,600 gal. In considering the capacity of tanks a consumer should not depend upon always being able to get the smaller-sized cars, nor should he install a tank which will hold only slightly more than a tank car, depending on a car to arrive in the yard just at the time the level in his tank has reached bottom. It is always preferable to have the storage divided into two tanks, so that repairs or cleaning can be done on one while the other is in service. This also permits accurate gauging, as with only one tank it is necessary to fill at the same time that oil is being withdrawn to the burners. Also in case of fire the oil from the burning tank can usually be pumped to the second.

The cost of steel tankage will vary from $0.50 to $1.00 or more per barrel, depending upon the size and location of the tanks. The lower price applies to 115-ft.-diameter units favorably located.

In general, tanks should be placed so that lines from both the source of supply and to the burners will be as short as possible, as long lines, in addition to being costly, must be kept warm when handling heavy oil in cold weather. Plants located along a river must place their storage above high water to prevent it from floating away, as an empty steel tank will float in a few inches of water and it is not always possible to fill it with water in time of floods. The location must be so chosen that there is space around the tanks for dikes. These may be of earth, masonry, or concrete, and should hold at least as much as the tank.

Solid Foundation A Necessity

If possible, a location should be selected where foundation work will not be difficult. Many tanks are placed on the ground without foundations of any kind. This should be done only where soil conditions are very good or the tanks are quite low, for a solid foundation is the first requisite in keeping tankage tight. Any settling of the shell is very liable to strain the seams enough to cause leakage. Preparation of the location should be all filling or all cutting, as a tank resting partly on filled ground and partly on a cut will settle unevenly. Where such a location is unavoidable, the filled portion of the grade should be left higher than the cut to allow for settling when the tank is filled.

(Continued on page 42)

Wherein We Restate Our Platform

NOW and again an irate reader, and sometimes a friendly critic, writes **Fuel Oil** charging us with partisanship or prejudice for this or that kind of an oil burner, or this or that type of oil burning equipment. Usually the reader has just read something in **Fuel Oil** that failed to conform to his conclusions on some moot question in oil burning.

We admit one prejudice about oil burning, and that is in favor of oil burning. Aside from that we have no special cause to plead; no "interest" to represent; no "type" of burner or other equipment to represent.

There are two schools of thought among publishers. One, which is losing ground to enlightenment and intelligence, makes everything published conform to its notion of truth or "good policy." The second believes the highest purpose of the business press is to give to its readers both sides of any trade problem upon which there is a considerable division of opinion. The first sets itself up as the mental wet-nurse of its readers. The second recognizes and respects the common sense and power of discernment of its readers, and leaves to them the right to think for themselves.

Fuel Oil belongs to the latter school. It has published, and will continue to publish opinions, conclusions, and statements about oil burning and the industry which in no way represent the views of its editors, but which do represent the honest opinion of men old enough to know their own mind whose opinion we respect, or whose opinion is representative of a substantial section of the industry. This policy was adopted with the full knowledge that to some partisan-minded people it would either be incomprehensible, or considered a show of weakness.

Fuel Oil has just one pledge. It appears on the title page: "Devoted to the efficient burning of oil." That devotion has been too well demonstrated to quibble about.

Most of Shipping Board Vessels Burn Oil

Seventy-five per cent of the U. S. Shipping Board vessels are now burning oil, according to C. J. Jefferson, of the fuel conservation department of the Board. The remainder, with the exception of one in which Diesel engines have been installed, burn coal. The number using Diesel power will soon be increased to 19, however, following the Board's recent large purchase of Diesel engines.

Diesels consume only about one-fourth as much oil as the average marine oil burner when sailing, according to Mr. Jefferson, and only about 1/12 as much when lying in port. The oil they use costs about twice as much as the oil required for the oil burner and the initial cost per ton of a Diesel powered vessel is about twice as much as an oil fired vessel, owing to the great difference in the original costs of the two units.

Coal Dealers Unsuccessful with Oil

If the experience of several coal companies in Chicago is a fair guide, the entrance of coal dealers into the business of supplying burning oils to consumers is not to be attended with any great degree of success. Numerous Chicago coal dealers who some time ago decided to enter the oil jobbing business on a modified scale have announced their withdrawal from the venture.

It does not pay to mix coal with oil, is their judgment. They now admit that knowledge of the oil industry and its customs and practices is apparently essential, together with the other advantages which come from specialization in oil products. Coal dealers who were operating one or two small tanks said they had received inferior grades of oil which brought dissatisfaction from customers. Their judgment is that, to successfully sell fuel oil, intensive cultivation of the field and a full line of equipment is necessary.

British Minister Says Oil Is More Economical

According to a recently issued public statement by Mr. Frank Hodges, an English Cabinet Minister (Civil Lord of the Admiralty), the world is "inevitably passing away from the use of raw coal as a fuel . . . . and another fuel, oil, has come into use, being more economical, more efficient, than coal itself." Mr. Hodges pointed out that last year England imported 5,000,000 tons of oil products and warned that unless unlimited supplies of oil are obtained, either through discovery of new oil fields, or by carbonization of coal or other methods, England can bid goodbye to commercial supremacy.

New Burner in Chicago

The Essey Oil Burner is the product of the S & E Oil Burner Company of Chicago. The company is composed of three men who formerly were associated with the Automatic Burner Corporation: J. Skold, O. Erickson and H. J. Neuhaus. The burner is automatic and is for use in residences. It is being marketed in Chicago.

Compensating Effect of Adjustable Boiler Controls

By John C. Bogle *

THE modern automatic oil burner is simple and adaptable. It is simple because it contains a small number of excellently designed wearing parts, and adaptable because it can be fitted into almost any make, type and condition of heating system.

The adaptation of a standard line of oil burners to its many fields of duty was early and wisely decided to be an engineering problem. The successful installations are those which reflect careful and intelligent study from the day of the preliminary survey until the final adjustments are made.

Fire Must Be Graded

Previous to the vogue of the present day automatic burner, which functions on an intermittent schedule, the art was occupied largely with manually operated machines which were usually of a graduated control. With manually operated systems we can perceive the capability of hands to adjust the various controls to satisfy the immediate duties of the heater. Without those hands to make the precise adjustments in correlation with the eye, and if dependance is placed upon automatic means to apportion the input to the load requirements, not only would graduated control require a complicated system of linkwork to secure the proportionate settings of the variables over a wide range of load, but also it would be necessary to have relatively a wide range of temperature in which to accomodate these changes, occuring from the smallest fire to the largest. When we consider that graduated automatic operation would thus be called upon to grade the fire to correspond with an outside temperature deficiency ranging from 5 to 90 degrees, we can calculate that this would require that the fire be graded from a small flame to one eighteen times as big.

There is one point of importance to which this discussion of graduated control is directed. Presumably, the heating system is always at or near its proper temperature for the work that is to be done. Of course this condition is not always maintained in practice. Especially in mild weather do we find a tendency for the graded machine to be operated intermittently, being cut off completely for large intervals.

Always Near Proper Heat

Supposing the pipes are always hot, however, the temperature gradient between the heating medium and the air in the room to be heated is more or less fixed for a given load. With variations of outside temperature the variations of input need not be great if promptly attended to, and the tendency to overtravel would be slight.

---

* Salesman, Absolute Contactor Corp.

The automatic intermittent burner with one fixed setting for its adjustable parts, is reduced to a simple mechanism which it is economically possible to build, install and maintain. The fire is either all on or all off, and the primary controls have only to get it started when heat is needed and to shut it down when the proper room temperature is attained.

Without accurately fitted boiler controls there is a tendency for intermittent heating systems to overtravel on the upward climb of temperature. Fortunately modern control systems can and do overcome this tendency. Boiler controls should be adjustable to meet the various conditions encountered in all kinds of installations.

Should Range Three Degrees

Intermittent operation should occur between two limits of room temperature not more than three nor less than two degrees apart. The room thermostat should initiate the heating event. When started, the oil burner first supplies heat to the heating medium, either hot air, hot water, steam or vapor. In turn the heating medium delivers heat to the air in the room. These heat transfers cannot occur instantaneously. There ensues a definite lag of time between the temperature of the heating medium and the temperature of the air in the room to be heated. When the heating medium reaches a temperature where with no further addition of heat the temperature would eventually be raised in the room to its proper degree, it finds that the room temperature has not yet reached this upper limit.

Without proper compensation from the boiler control device, the oil burner will henceforth continue to pump an excess of heat into the heating medium until when the room temperature has reached its upper limit the oil burner is cut off. This excess of heat applied, an excess over the requirements will produce an upward rise of room temperature even after the supply of heat from the burner has been interrupted.

This upward climb of room temperature is the overtravel.

Control Is Remedy

The remedy for it lies in the boiler control apparatus. If the heating medium is receiving its supply of heat faster than it can dispose of it conveniently and its own temperature has risen out of proportion to its eventual requirements, the boiler control functions to arrest the application of heat by the burner until conditions have had time to interadjust, that is until the temperature of the heating medium has decreased by delivery of some of its heat to the air in the room, which accordingly rises. Should an accurate balance not be realized at the first attempt, the effort will be automatically repeated, and with a relatively short distance to travel the proper room temperature will be reached and the oil burner cut off at a point where the balance between temperature is satisfactory.

Naturally, the setting of the boiler control is of paramount importance. This setting must be properly made to give satisfactory results. It goes

(Continued on page 82)

Oil Burning Research

By G. S. Meikle

PART II

THE problem of the alert domestic oil burner manufacturer is plainly two-fold. One suggests research into the chemical and physical properties of petroleum subjected to heat and the development, if possiple, of new ways and means of burning petroleum. This need not be restricted to any particular gravity of oil. It is impossible for one to predict the cost and final result of such procedure. It is, however, certain that well-grounded effort in this direction will be very profitable, particularly to the manufacturer who succeeds in accomplishing a definite result. Only through such effort may one expect to secure a great advantage in a field where now there are many competitors, most of whom are buying the essential parts of their apparatus from other manufacturers, these standard parts being assembled in some unique manner to give a more or less efficient unit.

Can Apply Accepted Principles

The other direction is to accept the principles of combustion already determined and to apply them to the fullest possible extent in the construction of a domestic burner, the unique patented features of which will give it a distinct and lasting advantage over the types now in the field.

It would be presumptuous to indicate that any one of the many domestic oil burners on the market is better than any other. When the burners are applied and operated under conditions for which they are designed, it is very probable from the point of view of efficiency, that there is little difference between them. It is true that one burner may have been installed under a larger number of favorable condiions than another and has therefore established a better record of success, when in fact the burners may be equally efficient under equally advantageous conditions of installation. It is therefore essential that, after the manufacturer has designed a burner possessing the essential features required to produce and burn a proper mixture efficiently under known conditions, more attention shall be given to the variables which are introduced in the installation of the oil burner in the many types of domestic furnaces.

Should Study Difficulties

Use of the burner will of course establish the difficulties which will arise and, if the service man has sufficiently keen power of observation, it will be possible for him to work out methods of overcoming these same difficulties in future installations. With the recorded observations of a sufficient number of this type of service-man, it might be possible to build up a rather comprehensive list of difficulties and efficient methods of overcoming them. This procedure, however, is not the one adopted by the aggressive manufacturer. The more logical and systematic procedure is, if possible, to induce all types of difficulties at will and to study them under controlled conditions.

Studies Natural Draft Burner

During the first part of the year 1924, the writer was called by an oil burner manufacturer to serve as an executive engineer, to study the products and determine their characteristics so that a more conservative sales-plan might be developed. It soon became evident that although the burners under consideration were of the natural draft gravity feed types, they possessed many desirable features hitherto not conceded by oil burner manufacturers in general. It further became evident that while the product in the main was the designer's best guess fortified by practical observation, the guess was a good one, the main difficulties resulting from improper application rather than poor design. This fact was best illustrated when a burner of furnace size was set up and tested under controlled conditions.

One of the most highly skilled service men in the organization was called upon to regulate and operate the burner for a full six-hour period under conditions which to his mind represented a satisfactory operation. At all times the flame tips were sharply defined and burning brilliantly. Combustion seemed to be complete and, so far as could be determined by observation, there was no smoke formation in the flues.

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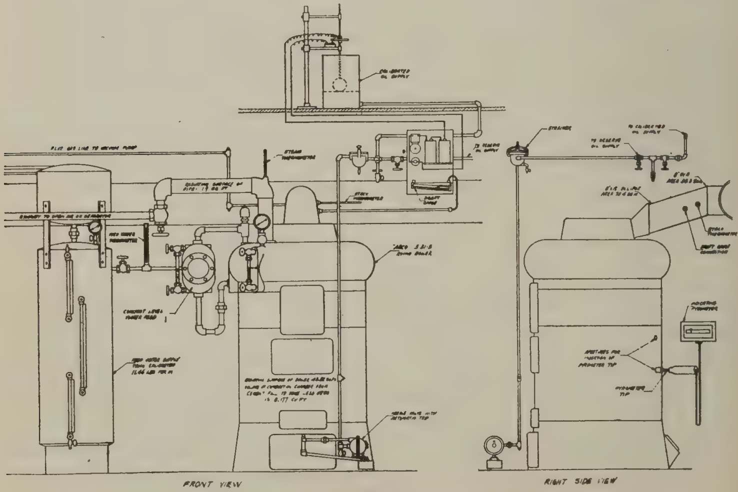
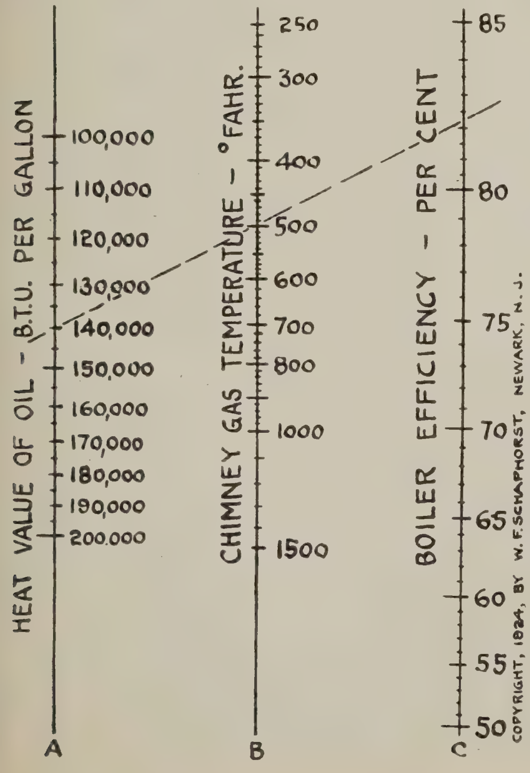


Figure I.

How To Find Your Approximate Boiler Efficiency

By W. F. Schaphorst, M. E.

THE term "boiler efficiency" is "Greek" to the average boiler user. Particularly is its determination Greek to the user if he has never made a theoretical study of steam boilers, if he hasn't the testing instruments for running a test, or if he doesn't know how to use the instruments if he has them.



I have gone into this subject with considerable care and as a result have developed the accompanying small chart which will enable anybody to find the approximate efficiency of a boiler without doing any pencil calculating whatever. Simply stretch a thread across the chart or run a straight line through the heat value of the oil, Column A, and the chimney gas temperature, Column B, and the boiler efficiency will be immediately found in Column C. Thus the dotted line drawn across this chart shows that if the heat value of the oil is 140,000 B. t. u. per gallon, and the chimney gas temperature is 500 deg. F., the boiler efficiency is about 82.2 per cent.

In developing this chart the writer carefully studied the averages of a number of authoritative tests where the boiler efficiencies varied from a trifle over 60 per cent to nearly 80 per cent. The heat value of the fuel was considered in each case, together with the temperature of the chimney or exit gases. As a result, this "rule" was derived: Multiply the temperature of the exit gases in deg. F. by 5000 and divide by the heat value of the oil in B. t. u. per gallon. Then subtract from 100. The result is the approximate boiler efficiency in per cent. This will be found to be a good "rough" rule provided the fireman is doing his level best to effect complete combustion. Of course if the fire is poor so that the gases contain a large per cent of CO the rule naturally will not hold.

For example, what is the approximate boiler efficiency where the heat value of the fuel is 140,000 B. t. u. per gallon and the chimney gas temperature is 500 deg. F.? Apply the rule and the result will be found to be 82.2 per cent just as indicated by the dotted line through the chart.

Output Divided by Input

The usual but much more complex procedure in determining boiler efficiency is to "find the heat in the steam evaporated by the boiler and divide it by the heat given up by the fuel." In other words, boiler efficiency, like all other efficiencies, is equal to "output" divided by "input."

However, why bother about the steam if we know the quantity of heat that escapes through the chimney? Can't we conclude that the heat that "doesn't" escape is absorbed by the boiler? To determine the output, then, simply subtract the heat lost up the chimney from the original heat in the fuel. Divide that by the "input," or the heat in the fuel, and we have the boiler efficiency.

Admitedly it is not easy to find the "exact" amount of heat lost up the chimney, but it can be done with a fair degree of accuracy if one knows the number of pounds of gas passing out of the chimney in a given time. The trouble is, the quantity varies with the different fuels used and with the different firemen. A first-class fireman with a CO_2 machine can regulate the flow of air until it is "just about right." Perhaps he will use 16 lbs. of air per pound of oil—perhaps more—perhaps less. 16 lbs. is usually considered a "good" figure.

For Chimney Temperatures

The chart will be found of further value for showing how important it is, always, to maintain as low a temperature in the chimney as possible. Thus, if you have an oil whose heat value is 140,000 B. t. u., swing a straight line about that point (Column A) as a pivot. If you can reduce the temperature of the chimney gas 100 deg. the boiler efficiency will be found to be over 85 per cent, or an increase of about 5 per cent. So much oil is wasted up chimneys at the present time, in spite of all that has been said, that it is hoped a study of this chart will clearly show the seriousness of high exit gas temperature.

A. H. Ballard has resigned as president of the Ballard Oil Equipment Company of Canada, Ltd. The offices of this company are in Toronto.

No Extra Fire Hazard With Oil When Proper Care Is Taken

By E. J. Smith *

A PROPERLY constructed oil burner, installed in accordance with the Regulations published by the National Board of Fire Underwriters and used with a reasonable degree of intelligence, should not involve a materially greater hazard than the use of the fuel it is designed to replace. On the other hand, neglect of essential factors will destroy the balance and leave us with an equipment that is a potential source of trouble.

Do not mistake the above statements to mean that oil, or any other fuel, may be used without hazard. It can't be done, and it is foolish to draw any conclusions based upon such an assumption. We can reduce the hazards to a minimum, but so long as we produce high temperatures and form combustible mixtures of inflammable vapors or gases with air, we must not forget that caution which probably had its origin very shortly after man discovered how to produce fire—"Don't play with fire."

Assuming that the purchaser has decided on a burner which he believes will meet his demands, he still has a rugged road to follow, if he should find it necessary to make his own installation. It is quite true that the manufacturer furnishes installation directions and that the National Board of Fire Underwriters will mail a copy of the Installation Regulations for fuel oil burners upon request, but even so, practical experience is so important that it is recommended that, wherever possible, the installation should be made by the manufacturer. In many cases, there is great temptation to install the oil burner in the simplest manner possible with no attention given to the condition of the furnace, of the smoke pipe or chimney, and with little or no attention to the protection of combustible ceilings or walls.

WE whiled away a few minutes one day perusing bits of propaganda which were probably sent out by some opponent of oil burning and we began to fear for the public mind if such "stuff" is widely read. So when, about that time, Mr. Smith submitted the accompanying article, we breathed a sigh of relief, for he is an expert in fire hazard matters, and we know his frank truths will eventually "out" to the entire public, overcoming adverse opinion. Proper installation and proper care demonstrate the answer to any criticism of oil burning.

(Continued on page 62)

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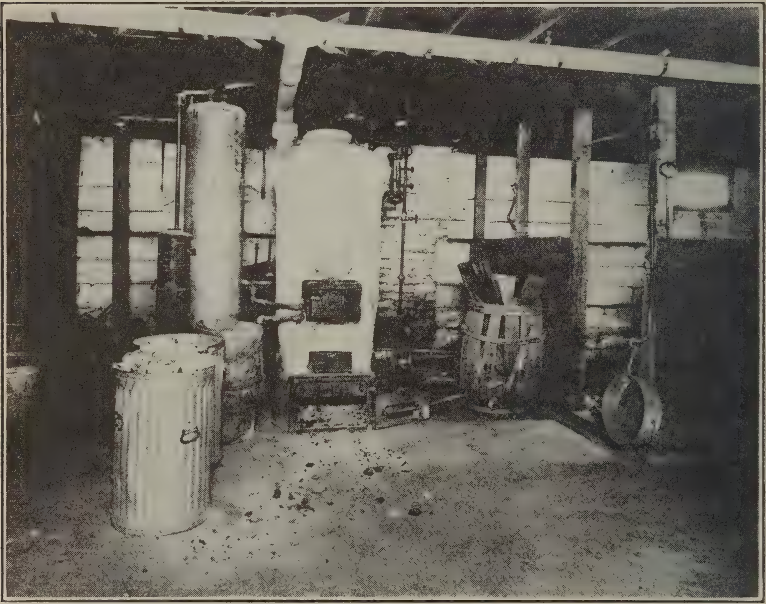
* Underwriters' Laboratories, Chicago.

Making the "Terrible Yesterday"—

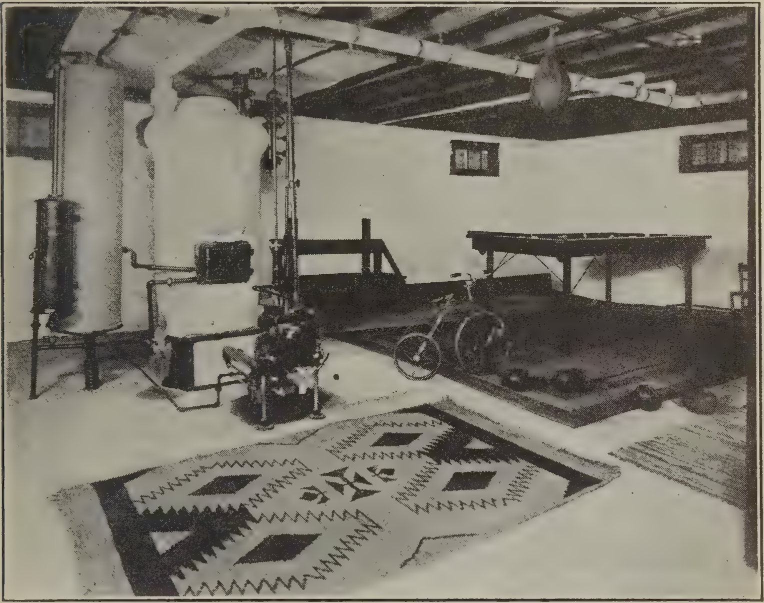


These photos are sufficient evidence to win the verdict for the domestic oil burner in any "Oil vs. Coal" debate. Each is authentic; one represents the condition of the basement before, and the other after, the burner installation.

It would hardly be fair to attempt to give the impression that every basement containing a coal-burning furnace is in the condition of the one shown above. Nevertheless, when coal is used, the presence of it and the ashes does make for similar conditions unless the basement is exceptionally well cared for. Ashes are not always strewn on the floor, of course, nor kept in such well ventilated cans, but the fact that there are ashes in the basement is always perfectly and unpleasantly noticeable.

A few coats of whitewash and the addition of the rugs and the oil burner have transformed an ugly spot into a pleasant one. No dust, no ashes mar the floor or the walls. A billiard table replaces the coal bin and the children can play—and retain clean hands and faces—on the old ash barrel site. And it will stay in just that condition, for there is no

The "Joyful Today"



Courtesy The American Nokol Company.

dirt brought in—at least the oil burner does not require that any be brought in.

At no time during the year is a coal basement a pleasant place to be in. Coal dust and ash dust are no respecters of the seasons for they rise from the floors and from the various cracks and crevices in the summer as well as in the winter, and swirl around when the basement is disturbed, falling on everything and everybody in an unhealthy layer.

Not so when the basement contains an oil burner. Cleanliness is sure to prevail the year around, with half way efficient care, and the use to which the basement is put in the summer—laundering, etc.—can be duplicated when the temperature outside is zero.

The difference between these two fuels is as the difference between cleanliness and dirtiness, comfort and discomfort, hard work and ease.

From the time the oil fuel "runs" easily and silently into the storage tank until it is burned and the products of its combustion pass up the chimney, its presence is a clean one.

"Burn oil, the modern fuel."

Union Oil Issues Fuel Oil Booklet

Much data on fuel oil is given in a booklet recently issued by the Union Oil Company of California. A number of pages are devoted to the advantages of fuel oil burning, especially with regard to marine burners. All of the Union's Pacific Coast bunkering facilities for handling oil for this purpose are explained in detail and the remainder of the booklet is given over to tables and discussions of fuel oil specifications.

Power Show Being Held In New York

The Third National Exposition of Power and Mechanical Engineering opens December 1 in the Grand Central Palace, New York. Apparatus designed to increase the effectiveness and economy of combustion is to form an interesting part of the exhibit. Devices for measuring the flow of liquids and gases for measuring and regulating temperatures will also be included in the great array of apparatus shown.

New York Consumption Is Reviving

The Petroleum Heat and Power Company's sales of fuel oil in New York City's downtown district during 1924 have been estimated at 800,000 barrels, according to a recent announcement, an increase of 40 per cent over 1923. The company is now supplying about 125 plants and buildings in this district with fuel oil, among which are some of the largest office buildings, hotels, hospitals and stores in the city.

Many Cement Plants Burning Fuel Oil

Oil is used for fuel in a large number of Portland Cement plants in various parts of the country. The number of plants where oil is now burned is about equal to the number using coal as fuel, according to information from the Portland Cement Association. While local conditions at each plant are determining factors in selecting the most "ecoefficient" fuel, fuel oil is being used efficiently and satisfactorily in many cement plants.

Unit Blowers Show Saving

In an installation made in a large railroad power plant several months ago by the Mahr Manufacturing Company, Minneapolis, Minn., in which a single blower system was replaced by a unit blower system, a saving in operating costs of about 19 per cent was effected. The previous operating cost of the blower averaged $107.50 per week. The new equipment, consisting of 18 individual motors, has shown a cost of $89.50 per week.

Announce New Storage Outfit

Announcement of a new tank storage outfit designed especially for oil burner installation was made recently by the Sharpsville Boiler Works Company, Sharpsville, Pa. It includes a 50-gallon supply and a 220-gallon reserve tank, with a pump and other equipment complete.

Two Years of Cold Weather Ahead?

Conditions Indicate Months of Unusually Frigid Temperature Coming, According to Forecasters

By Keith J. Fanshier

MEMBERS of an industry so closely linked with the established atmospheric conditions as the oil burner industry will be interested in conclusions reached by scientists as to possibility of unusually cold weather ahead for the next two years.

So fundamental are the facts of nature relating to the weather that any disturbance in their normal operation, such as is predicted in certain scientific quarters for the near future, would have far-reaching effect upon habits and customs of the people, and consequently would hold a real significance for industrials, especially for the oil burner and the related industries, tied up with the making of homes comfortable and the furnishing of power for industries.

A Year Without a Summer?

Briefly, long, hard winters are being forecast for the next two years, with the prediction of the possible recurrence of a phenomenon which brought misfortunes to many in this country more than a century ago—a year without a summer.

It is a matter of history that the year 1816 was one of extreme cold. During that year practically no crops were raised north of what later was known as the Mason-Dixon line, and only a partial crop in the South. Frost, snow and ice formed in every state north of the Ohio River during every month of the year. Half an inch of ice was reported at Philadelphia on July 4, 1816.

History has been known to repeat itself. So have historians. Weather experts and scientists at the Smithsonian Institute, Washington, D. C., are inclined to believe that, during 1925, 1926 and 1927 it may do so in this respect. And it must be remembered that present-day weather experts have little in common with the old time "weather man" whose prognostications had little foundation in fact. Few modern sciences have developed more rapidly or deserve more respect than that of weather forecasting.

Sun's Heat Delayed

Through recent developments in this science, it is possible to foretell the general trend of weather two and three years in advance. Since 1905 weather experts have known that penetration of the sun's heat does not affect our climatic conditions immediately. Rather, they agree that the sun's heat is delayed in its earthly effect two or three years. They recognize what is known as the "solar constant." This is the amount of heat delivered to each square centimeter of the earth's surface per minute. Now, whereas the normal solar constant is 1.94 gram calories, since 1922 these solar radiation values have decreased markedly. From

May, 1922, to June, 1923, the solar constant was continually below 1.92 and still is below normal.

Caused Bad Summer In 1922

Material lessening of the sun's heat penetration in 1922 is given by Professor Herbert Janvrin Brown of the Smithsonian Institute as the reason for the chill, backward and erratic summer of 1924. The low tendency of this constant through 1923 and thus far in 1924 is the reason for the prediction that next summer and the following one will be increasingly cold, with possibility for the return to the 1816 condition —"a year without a summer."

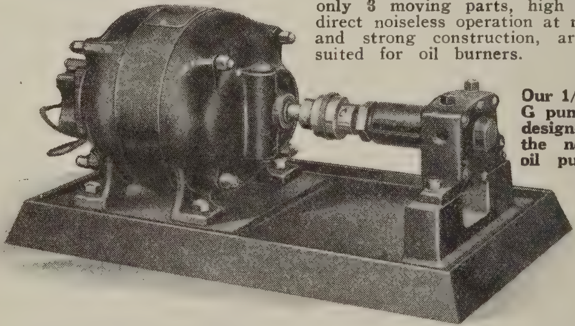
Support of the value of such research is to be had in present ocean temperatures. Many vessels have reported oceanic temperatures approximately 12 degrees below normal in the last six months, in practically all waters. Extreme cold in parts of the world and unprecedented floods in others have been reported. These conditions are effects of the solar constant decline, say the experts. With the highly developed aids of science at their disposal, such conclusions as they reach, however sombre are worth taking into consideration.

Planning For Emergency

It is reliably, although quietly, reported that several large companies in the electricity and gas producing industries are already laying plans against such a three-year emergency. It is readily to be seen that the realization of these predicted conditions would create great demand upon such industries, and upon the oil and

Simple — Durable — Noiseless

Teesdale Pumps for oil burners, having only 3 moving parts, high suction lift, direct noiseless operation at motor speed, and strong construction, are especially suited for oil burners.



Our 1/6-h.p., Type G pump has been designed to meet the need for an oil pumping unit for float switch or standby operation.

Write for Descriptive catalog on Types B and C pumps for pressure work.
WE BUILD TO CUSTOMER'S ORDER TO FIT HIS APPARATUS.

Teesdale Manufacturing Company
320 DOUGLAS STREET GRAND RAPIDS, MICHIGAN

oil burner industries, and those industries connected with them. Application to Professor Brown for more detailed information doubtless will emphasize the value of such preparation on the part of the industries, upon which a radical change in atmospheric conditions would have an important effect. Judgment, however, will show the advisability for quiet planning. Preaching alarm doubtless would be a poor policy, not sanctioned by the experts.

Predictions Not Questioned

Professor H. J. Cox, senior meteorologist of the United States Weather Bureau stationed at Chicago, is in close touch with this situation. He points out that Professor Brown and his associates changed instruments in the course of their investigations, but at the same time refuses to discount their predictions.

Thus, in view of the influence our weather has upon oil burning and the sale of burners, it may pay to "keep a weather eye out."

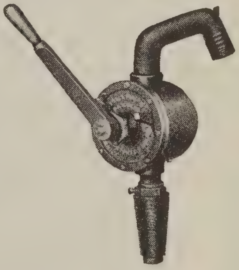
Predict Much Building in 1925

Oil burner manufacturers and dealers will be interested in predictions for a large building year in 1925. According to information from architectural authorities, it is expected that construction in 1925 will about equal the figures of 1923, when the total for the United States was approximately four and one-half billion dollars.

To Oil Burner Manufacturers and Dealers:

The Force Pump delivers from 12-15 gallons per minute with the slightest pressure on the handle. No strength is necessary to operate it. It sometimes happens in emergencies that wife or child may have to take care of filling supply tank in basement. Either one can do it in just one-half a minute without undue effort, by using the Force Pump, the pump of long life and satisfaction.

Allow us to send you one for demonstrating purposes.



FORCE PUMP COMPANY

1821 Berteau Avenue **CHICAGO, ILLINOIS**

Name........................ Adderss....................................

....

Burner Ignition Methods Becoming Varied

Gas, Oil and Electricity, Each in Several Variations, and Sometimes Combined, are the Agents Employed

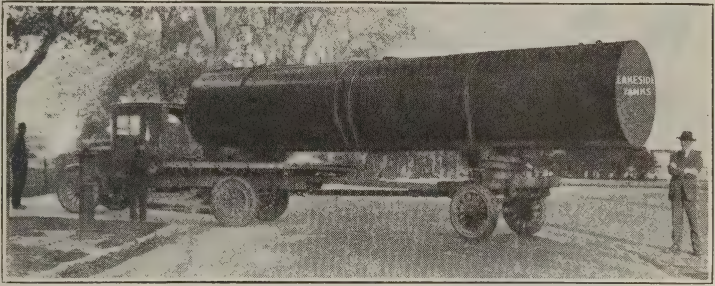
WITH the widespread introduction of the oil burner into domestic use has come the development of safety devices that equal in importance the burner itself. The various grades of fuel oil can be made to burn, but to insure oil burner operation safely and automatically, day in and day out, requires as much attention and development as the actual designing of the burner.

NO other topic related to oil burning has received more attention during the past few months than ignition. Oil or gas pilot lights, electrical methods, or different combinations of two or three of these, have each their enthusiastic proponents. Electrical ignition is the youngest of the three and this article, as can be easily seen, is by one who believes in it, particularly the arc method.

One of the usual means of ignition is the gas pilot, the use of which concentrates the sale of domestic oil burners in localities where illuminating gas of a known quality and constant pressure is found. Oil pilot lights and electric devices are other ignition methods used.

There were several means of electrical ignition available for the oil burner. One is the hot wire method, which means heating to incandescence a bare wire of heat resisting metal in contact with the fuel to be ignited. To operate such a means of ignition, a low voltage and a comparatively high current is necessarily required. It must be heavy enough to withstand the heat of the flame when the furnace is in operation, and it must also withstand vibration. On account of its size and weight, considerable power is required to heat it, and an appreciable period of time elapses, after the closing of the electric circuit point of sufficient heat necessary to ignite the fuel.

A second method is the use of conventional battery ignition units, as used in automobile engines. If a battery ignition unit is used, either with a rotating cam actuating an interrupter, or with a vibrating interrupter, the sparks will have only a small heat value, and will be insufficient to ignite the heavy fuels. This method generally requires the use of the higher grade, lighter oils. It is not necessary to use a battery as a source of current for the bat-



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Welded with the Electric Arc Process. Made in all sizes from 60 to 24,000 gallon capacity. Popular sizes are carried in stock for immediate delivery.

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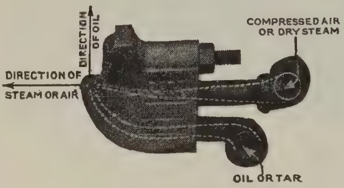
North Milwaukee, Wisconsin

Chicago Distributor

American Tank and Installation Company
1320 Burnham Building, 160 N. La Salle Street
Phones: Central 6841, Sheldrake 3544

W. N. BEST

Oil Burners



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505 West 57th St.
New York City

tery type of ignition, as in its stead a transformer may be used to reduce the voltage of the 110 volt lightning circuit to 6 volts or 12 volts, for operating the battery ignition coils. However, this does not change the character of the spark. This method has a spark appearing as a bright, white line, which is characteristic of radio frequency discharge. Because of the high frequency of this discharge, and because it is difficult to shield the high tension leads, such a system becomes a miniature radio sending system, and may cause interference with radio sets in the vicinity.

Gasoline Engine Type

A third method is the conventional type of magneto having a contact breaker, as developed for gasoline engine ignition. This has the same characteristics as the battery ignition unit, when run at low speeds. When run at very high speeds—that is, above 3,000 r.p.m., the discharge becomes more or less a continuous arc, rather than a succession of disconnected sparks. The heat value of this discharge is high, and the interference with radio sets will be very much less than with battery ignition systems. However, the wear in the contact points of a magneto operated at this speed is somewhat excessive. An ordinary magneto, run at from 400 to 1,000 r.p.m., will give very satisfactory ignition, where radio interference is not a factor.

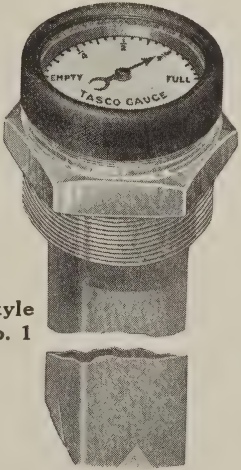
Still another type of electric arc ignition for oil burners has been developed by The American Bosch Magneto Corporation. It is a high tension arc ignition unit in which a sufficient voltage is obtained by rotating a specially wound armature of fine wire in a strong magnetic field to jump the ignition gap without the use of primary winding, a condenser, or an interrupter. This unit is operated at a speed of 3,500 r.p.m., giving 7,000 sparks per minute across the ignition electrodes. The arc is practically continuous, and there is no radio frequency discharge. The heat and the quality of this arc are sufficient to ignite the heaviest of fuel oils. The arc occurrence across the electrodes is instantaneous.

Must Meet Great Heats

The application of this magneto to the burner requires, of course, an ignition plug of a character and construction entirely different from the popular conception of a "spark plug." The live electrode must be insulated for approximately ten thousand volts. The ignition plug unit is subjected to extremes of temperature from that of a cold furnace in zero weather, to the high heat developed by the oil flame. The range may be anywhere from 30° below zero to the neighborhood of 1,800° F. The electrode tips, between which the arc occurs, are subjected not only to the heat of the flame, but also to the heat of the electric arc. Often the electrodes become red hot and the tips white hot, requiring electrodes of chromium and nickel alloy. The insulator must also be protected from soot and raw oil. Various types of burners require different types of ignition plugs, which vary in size and design to meet the conditions developed by the different burners.

"TASCO"
Gauges

For Oil-Burning Equipment, Oil Tanks, Oil Pumps, etc. are standard equipment on most jobs of this kind.



Style No. 1

TASCO Gauges have been adopted as standard by the Navy Dept. and were used on the Douglas World Cruisers which made the round-the-world flight.

Send for complete information on different styles

The Akron-Selle Co.
"40 years in Business"
AKRON, OHIO

Fuel Oil Burning in the United States Navy*

Giving Type of Atomizer, Combustion Data, Boilers, and Refractories.

By Lieut.-Com. H. G. Donald,[1] U. S. N.

FUEL oil burning in the United States Navy has developed from a trial installation of combined coal and oil on capital ships in 1910 to exclusive use today of oil fuel under all types of boilers and on all classes of naval vessels. The kind of fuel used has passed from a very light fuel oil, now considered a Diesel oil, to crudes as heavy as 12 degrees B. requiring a temperature of 220 degrees F. for atomization.

As Important As the Guns

There are many reasons why this development of fuel oil burning in the Navy should have taken place, but the military reasons have been the oustanding ones. Fuel oil is worth every bit as much to a fleet as are the modern 16-inch guns with a range of 30,000 yards or the latest torpedoes capable of maintaining a 30-knot speed for 15,000 yards. The main strategical advantages of oil as a fuel may be stated as:

Ability to maintain maximum speed to limit of fuel capacity.
Ability to attain designed speed throughout life of ship.
Flexibility of speed control with almost instantaneous change from stop to full speed.
Longer cruising radius on same weight of fuel.
Less weight and space per boiler horsepower.
Due to high rate of combustion possible, permitting use of small-tube water-tube boilers with material reduction in weight of boiler plant per shaft horsepower of main propelling machinery.
Permitting distribution of boiler plant advantageously to provide maximum protection and minimum length of steam piping to propelling machinery.
Shortening time to fuel and making fueling at sea practicable in almost any weather.
Allowing fleet to steam at high speed without detection by smoke.
Bringing actual fleet cruising nearer theoretical speed and making possible tactical handling of a large number of similar vessels at a speed within less than 10 per cent of designed maximum speed of the individual vessels.

Use Pressure Atomization

Mechanical or pressure atomization is the only method of atomization that has ever been attempted, air atomization being prohibitive from weight consideration alone and steam atomization impracticable because of the loss of fresh water involved. The oil pressure has not gone over 300 lb. per sq. in. gage, but all installations permit of regulation down to 125 lb. It has been found to be best to use atomizer orifice sizes such that the pressure is between 250 and 300 lb. with, at the same time, a maximum number of burners in use consistent with the steam demand.

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* Presented at the Annual Meeting, December 1 to 4, 1924, of The American Society of Mechanical Engineers.

[1] Fuel-Oil Testing Plant, U. S. Navy Yard, Philadelphia, Pa.

The Navy has standardized on a single type of atomizer for fighting ships. This type has a flexibility, with choice of orifice, of 150 to 2000 lb. of oil per burner per hour.

The design of the "register" has received most extensive investigation, resulting in the reduction of excess air to 15 per cent. The registers for future installations will be of only two sizes. The smaller is capable of burning aid with a CO_2 of 14 per cent from 150 to 1000 lb. per burner per hour. The larger size handles from 300 to 2000 lb. per burner per hour with CO_2 averaging 12.5 per cent. Both of these types of registers are the so-called natural-forced-draft type, that is, they will successfully burn about 25 per cent of maximum capacity with 0.3 in. draft (the average "natural" or smoke-pipe draft to be expected in a marine installation).

Air Pressures High

The air supplied for combustion from moderate power to full power has until very recently, been obtained through steam-turbine-driven blowers discharging into a closed or air-tight fire room. Fire-room air pressures as high as 10 in. of water are found in high-speed vessels. In order to reduce overall steam consumption

NIAGARA OIL METERS

Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.

2926 Main St.

Buffalo, New York

when operating at light load, the Bureau of Engineering perfected two sizes of burners fitted with light-weight high-speed turbines mounted integral with the registers for separate air supply to each burner. At first it was considered installing in each fire room only enough of these "blower burners" to operate the boilers up to cruising load. However, the installations have proven so practical and to have advantages not altogether foreseen when the idea was originally conceived, that it is anticipated future construction will be entirely equipped with this type of burner.

Closed Fire-Room System

Owing, however, to the impossibility of attaining maximum required boiler rating without positive furnace pressure, with consequent gas leakage into the confined boiler rooms, it will still be necessary to retain the closed fire-room system with steam-driven forced-draft blowers discharging into them, but at a fire-room air pressure much lower than that required with the open-type registers without blowers attached. That is, at high rates of combustion the main forced-draft blowers would be operated in conjunction with the blowers on the individual burners. The so-called "blower burner" has a number of practical advantages that recommend its use in stationary practice, the principal ones being ability to materially increase boiler rating at low first cost and assurance of steady draft control under all weather conditions.

M-D-Co. Pumping Equipment for the Oil Burner Industry

CATALOG "A" describes in detail M-D-CO. HAND PUMPS, DIRECT DRIVE MOTOR DRIVEN HAND CONTROLLED UNITS.

M-D-CO. Hand Pumps and Pump Units are built especially to handle fuel oils efficiently.

BULLETIN NO. 461

M-D-CO. AUTOMATIC MOTOR DRIVEN AUXILIARY TANK PUMP UNIT (Mercury Switch controlled.

The most reliable mercury contact Automatic Pump Unit, built with that degree of care to eliminate that costly servicing expense.

As positive as the Mercury Boiler Pressure Switch and as dependable as the modern electric motor.

It will be well worth your time to send for CATALOG "A" and BULLETIN NO. 461. Catalog complete with illustrations and descriptions, engineering data, we are sure you will admit is well worth writing for.

Mechanical Devices Company
Main Office and Factory: Aurora, Illinois

CHICAGO OFFICE
549 W. Washington Blvd.
Phone: Franklin 2471

Eastern Office
325 Federal Street
GREENFIELD, MASS.

The efficiency of the small-tube water-tube boiler at high rating and its low upkeep cost, together with decrease in weight and space below that of the large-tube water-tube boiler, have caused its adoption as standard for capital ships as well as light cruisers and destroyers. In fact this type of boiler may be said to be standard for naval vessels of all types.

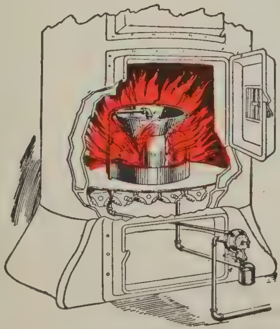
78 Percent Overall Efficiency

Present practice would call for combustion under this type of boiler of 1 lb. of oil per sq. ft. of heating surface. This is equivalent to a 435 per cent boiler rating on the A.S.M.E. standard, assuming an evaporation from and at 212 degrees of 15 lb. water per lb. fuel. Data obtained at the fuel oil testing plant of the United States Navy shows that the approved types of small-tube water-tube express boilers should give an overall efficiency of 78 per cent at this rating with the type of fuel oil burner approved for naval use, with superheating surface 10 per cent of boiler water-heating surface and no economizer. In 1919 oil was burned at the rate of 1.5 lb. per sq. ft. of boiler water-heating surface under a White-Foster (small-tube water-tube) boiler at the fuel oil testing plant using the Babcock & Wilcox atomizer and their "Cuyama" (1000 lb. per hr.) burner. The data taken on this test showed equivalent evaporation per sq. ft. of boiler water-heating surface of 22.7 lb. per hr. and an overall efficiency of 76.15 per cent.

(Concluded in the January Issue.)

The Burner You Have Waited For

Don't experiment; seven years proved success



A burner that combines reasonable price with efficient, dependable service. Only moving part is a hand controlled fuel valve. No huge service costs to eat up your profits.

Think of the market such a burner has!

Our sales plan will interest responsible dealers. Write for it.

Worthington Burner Co.
1322 McGee St. Kansas City, Mo.

Heating the Home

Installation Can Make Success Or Failure of Burner

By George W. Graves

ALTHOUGH we do not always recognize it, the installation is probably the most important step in the life of the oil burner from the time it is manufactured until it is functioning properly in its owner's basement. At least it is upon the installation that the final satisfaction of the owner depends. And, if the cause of oil burning is to be advanced, that satisfaction is all important.

INSTALLATION men do something that salesman or the sales manager cannot do, for they go into the home of the purchaser and stay there for a considerable time while they are installing the burner. While thus engaged they represent the sole outpost of the dealer and the manufacturer in their relations with the customer. Hence, care should be taken that the installation crew is not likely to "clog up the line" of friendly feeling between the customer and the dealer and thus bring to naught the good intentions of the manufacturer, the distributor and the customer himself.

The attitude of the installation foremen and crew must be correct. A burner may work well, but the confidence of the purchaser, in the machine, in the dealer and in the manufacturer, may be shaken by some crude, unwitting remark or action on the part of an installation man. An unconscious aversion to the product and everything connected with it may result in the mind of the buyer from a seemingly unimportant error made by the workers. In this, as in many other ways, the oil burner can be compared with the automobile. Everyone who operates a motor car knows that the mechanic who works on it can do much toward building up or destroying the prestige of the car in the mind of the buyer.

Courtesy is an indispensable requisite of the installation man. Qualities of silence, neatness and care are among those which must be possessed. Neatness should include a desire to remove all traces of dirt and confusion when a job is finished. All tools should be taken away and every detail of the job finished.

Unless the workman is an expert

(Continued on page 40)

What is Copper Steel?

It is a steel and copper alloy, from three to five times more durable than ordinary steel. We know it is that much more durable, because the bottoms of all Butler Galvanized Fuel Oil Storage Tanks are reinforced with Copper Steel and *the service they give is ample proof.*

Send for this

Correct advice on so important a thing as a tank purchase is priceless.

We have a booklet, entitled "Fuel Oil Tanks for Oil Burning Equipment," that is probably the most complete discussion of its kind ever published. Practically every question one could ask about tanks is answered.

Write for this Booklet today

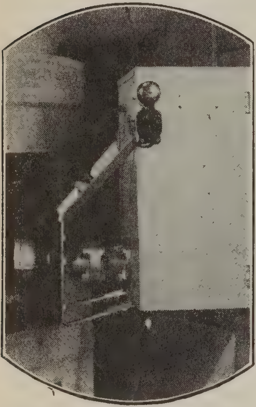
This is but one of the ways in which Butler-Built tanks excel. Horizontal Welded Tanks are made in eight different sizes, from 555 to 3155 gallons, of tested 10, 12 and 14 gage steel, a variety enough to meet any need. Fittings are furnished with each tank.

Two conveniently located factories and energetic, anxious-to-please shipping departments make prompt shipments one of your joys.

Butler Manufacturing Company

Kansas City, Mo. **Minneapolis, Minn.**

"And now another SENSATION" *The "SUMMERHEAT" Standard—* Automatic Fuel Oil Burner is Ready



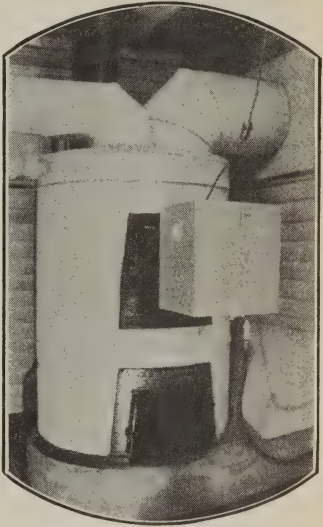
(*We announced "SUMMERHEAT" DeLuxe in November FUEL OIL*)

"Summerheat" Standard is an automatic mechanical burner—quiet in operation—completely atomizes any grade of Fuel Oil (from factory fuel to Kerosene) and burns it slowly and quietly in suspension—ignited by our exclusive low voltage non-sparking electric ignition without gas or other pilot light—safeguarded by our instantaneous thermostatic safety control (which operates independent of the caloric condition of the furnace)—No drip bucket—no fire pot—no gas pilot—no oil pilot nor high tension electric ignition to worry with and no transformer.

"Summerheat" Standard like the DeLuxe is made only in one size and by moving a simple lever you can control the flame length and heat intensity from a mere flicker to a tornado of flame (this allows use of same machine in small pipeless furnace or a large hot water or steam plant). It performs equally well in hot air, water or steam plant. ***Fuel capacity from 1 to 6 gallons per hour depending upon size of heating plant or flame length adjustment. (Atomizes and ignites electrically any free flowing Fuel Oil regardless of gravity).***

The percentage of oil to air is automatically kept constant throughout the entire flame length range by our unitory oil and air propulsion means (an entirely new and exclusive principle) therefore perfect combustion without carbon. The flame is sprayed rather than blasted into the furnace (Furnace and Boiler Manufacturers appreciate this new feature).

"Summerheat" Standard like the DeLuxe normally attached to the "feed" door and as a result the grates are not removed thus allowing furnace or Boiler to be used as garbage incinerator, or a coal fire may be built as before (on a moments notice) without disturbing oil burner, therefore with "Summerheat" you have a dual heating system and most important of all is the fact that the original efficiency of the heating plant is maintained, and undisturbed. This method of installation makes "Summerheat" instantly and completely accessible (Service men appreciate this feature).

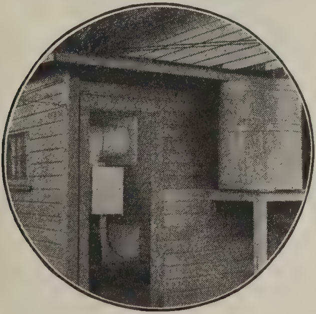


Being completely automatic including on and off feature and yet not having any electrical relay switches or auxiliary controlling mechanisms makes "Summerheat" Standard sensibly simple (Distributors will appreciate these features).

No pressure pump is used thus allowing large fuel nozzle (no clogging from uneven or dirty oil). Therefore our startling statement "Any oil from factory fuel to Kerosene completely atomized and burned slowly in suspension" (jump spark electric ignition cannot flash the denser oils successfully without resorting to gas for assistance). "Summerheat" low voltage non sparking electric ignition is positive in its function regardless of whether Kerosene or cylinder oil is coming through and coupled with this safety factor is the fact that unless "Summerheat" ignition is in perfect working order the entire device remains dead (this important safety feature is entirely independent of the regular instantaneous thermostatic safety control).

The motor (1/25 H.P.) runs normally at only a fraction of its rated speed (the same as your automobile) and draws approximately 70 watt. (You can expect years of service under these conditions.) The "Summerheat" Standard, like the DeLuxe is universal, accommodating any 110 Volt D. C. or A. C. current any cycle—no special wiring necessary.

Average installation (as illustrated) consists of drilling 1¼ inch hole in "feed" door and bolting on "Summerheat" (this work can be done in your shops). Then when furnace door is put back on its hinges the "Summerheat," is installed. The oil hookup consists of connecting flexible metal lined hose (which we furnish) to oil line or tank the same as attaching garden hose to hydrant. The electric hookup consists of screwing plug into the everpresent basement socket. Flexible BX cable to "Mercoid" room thermostat completes automatic hookup.



Average installation requires less than two hours.

The DeLuxe is more luxurious, retailing for $395.00 complete.

The Standard meeting every requirement for successful automatic fuel oil burning in the home retailing for $245.00 complete with "Mercoid" room thermostat and flexible metal lined hose. (Does this not justify our use of the word "Sensation"?)

Until additional manufacturing facilities now being negotiated are available we expect to be "snowed under"—Our Distributors' deal is a real deal with adequate discount and complete protection—We suggest that you wire then write in-as-much as our policy is to allot territory to qualifying distributors in the order that applications are received.

Electromatic Appliance Corporation
Hamilton, Missouri

INSTALLATION CAN MAKE SUCCESS OR FAILURE OF BURNER

(Continued from page 36)

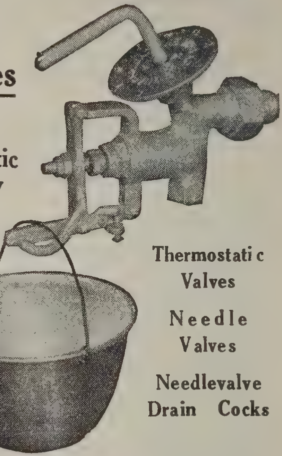
he should be warned against attempting to instruct the owner, and should leave that, instead to the foreman or the salesman. However, they should be able to answer simple questions, for which a fundamental knowledge, of course, is necessary.

The members of an installation crew should be made to feel that they are essentially members of the sales organization and that they are "selling" the oil burning device just as much as the regular salesman when they make an excellent installation.

The final instruction to the householder often falls to the installation foreman. For this reason he should be highly competent, and should be something of an engineer, a salesman and a psychologist. He is the last point of contact of the company in the sales and installation work. His is the opportunity to do much for mutual goodwill. He should have the patience to "stay with" the customer until he has a working knowledge of the machine.

Cleary in Cleveland for the Combustion Company

James Cleary, formerly manager of the Combustion Engineering Corporation's Philadelphia office, has assumed management of the Detroit and Cleveland territories, with headquarters at Detroit. Frank Henderson continues in charge of the Cleveland office. Joseph Lappin, formerly in charge of the Detroit office, has been assigned to New York for special work.



Oil Valves

Acme Automatic Safety Trip Valves

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Needlevalve Drain Cocks

Acme Brass & Machine Works
609-611 East 17th St. Kansas City, Mo

Sun Oil Burner

Experienced fuel oil dealers prefer the SUN because they can supply it both for low priced natural draft installation and when completely automatic power burner is required. It offers them more practical and proved selling points and is efficient and economical. Write for particulars.

Heat Equipment Corp.
134 So. 13th St. Lincoln, Nebr.

Issue James Burner Booklet

Twelve reasons why the average home owner should install an oil burner are given in a booklet issued by the James Oil Burner Company, Pittsburgh, Pa. The James burner, the only one manufactured in Pittsburgh, Pa., is of the natural draft, pre-heating type and has several combustion nozzles which can be operated separately or in combination.

A. S. M. E. Makes Recommendations For Boiler Tests

In making capacity and economy runs, the committee of the American Society of Mechanical Engineers on boiler tests make certain recommendations in the code to be followed in conducting such tests. Two methods in general are adopted; one, the Standard Method which provides for drawing the fires after the boiler has been brought up to operating conditions and building new fire with weighed fuels; the other, known as the Alternative Method, permits the beginning of a test without drawing the fire. Fire box conditions are carefully observed so that they may be maintained the same at the end of the run as at the beginning. Weighed fuels are merely added.

Philip H. Fleck, heating engineer, of Ossining, N. Y., and Edgar W. Dennison, "comfort engineer," of Tarrytown, N. Y., have been appointed distributors of the Williams Oilomatic burner in Westchester County, N. Y., and announce that they have secured a Westchester County license for the Oilomatic.

GOULDS

Hand Rotary Pump for Fuel Oil Systems

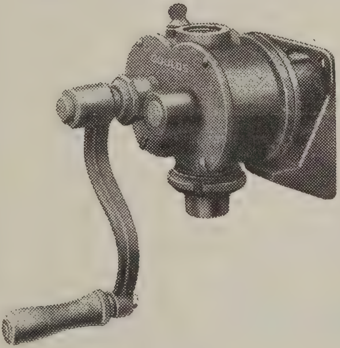


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings for handling distillate.

Furnished with bracket for attaching pump to side wall. This is a big improvement over the type that depends on pipes for support.

Capacity—10 gallons per minute.

Note:—We also have a complete line of motor driven pumps for the same services.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. **Seneca Falls, N. Y.**

Books

of special significance to anyone interested in oil burning.

Burning Liquid Fuel
By William Newton Best
$5.00

A practical treatise on perfect combustion of oils, giving analyses, calorific values and heating temperatures of various gravities with information on design and proper installation of equipment for all classes of service.

Fuel Oil and Steam Engineering
By Robert Sibley and C. H. Delany
$5.00

An unusually complete treatment of fuel oil, for the central station man, the power plant operator, the mechanical engineer and the student.

Oil Fuel for Steam Boilers
By Rufus T. Strohm
$2.00

Describing the principles that underlie the use of oil as a fuel in steam boiler practise; the form and action of various types of burners; arrangement of furnaces for burning oil under different kinds of boilers; the operation of accessories such as pumps, heaters and cleaning devices; the methods of storing oil.

Industrial Uses of Fuel Oil
By F. B. Dunn
$3.00

Practical exposition of the use of fuel oil for industrial purposes, giving much specific information gotten through first hand experience.

Liquid Fuel and Its Apparatus
By William H. Booth
$4.00

Descriptions of various systems and apparatus; information on petroleum production and handling; and explanations of combustion principles and theories.

Prompt Attention Is Given to All Orders.

Check should accompany order.

FUEL OIL
for Heat and Power
350 Madison Ave. New York City

STORING AND HANDLING OIL IN INDUSTRIAL PLANTS

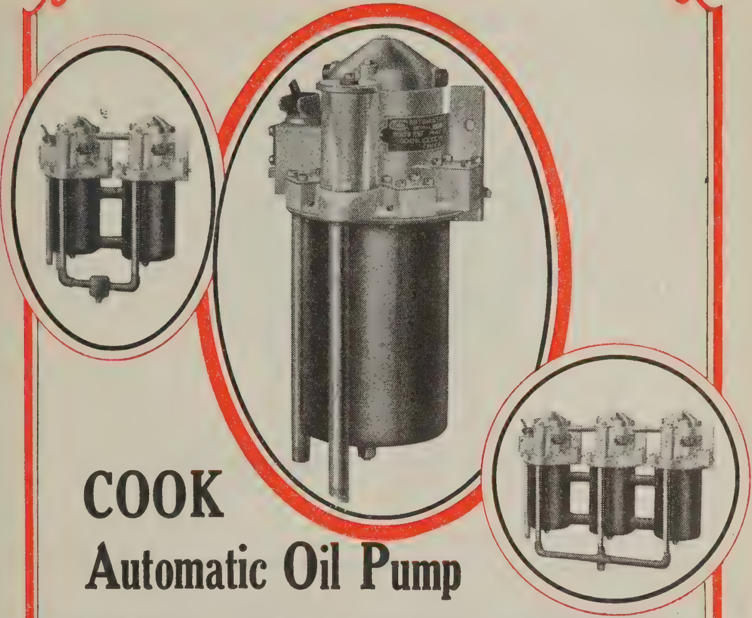
(Continued from page 10)

On good bearing soil no concrete need be used. Excavation should be carried to a firm, hard bearing, the top soil and other loose material being replaced by some good filling material, the top 8 to 12 inches being clay or loam or a mixture of sand and clay. A tank bottom placed directly on cinders will corrode very rapidly. The tank grade should be of greater diameter than the tank, and provision made against its being washed away by rain.

Use Concrete Slab on Piles

When tanks are erected on piling the usual practice is to build a load-bearing concrete slab over the piles with a concrete ring at the outer edge. Reinforced concrete slabs are also used where the soil conditions are uneven with soft spots. Concrete slabs should always be covered with a cushion of sand or sand and clay, otherwise rivets may be sheared off and the calking sprung. Where a tank is to be erected on a deep fill over good ground, a concrete ring may be used for containing the fill. The fill should be properly crowned so as to compress with the weight of a full tank.

The bottom sheets are mounted on horses two or three feet high. After these and the first course of the shell have been riveted and calked, water is pumped in to a depth of about six inches and any leaks made tight by calking. The bottom is painted with asphaltic or graphite paint and then let down on the foundation with con-



COOK
Automatic Oil Pump

Is a bellows type of pump that contains no packing.
It delivers oil to the burner exactly as required.
It is positive and reliable in its operation.
It is easily installed, noiseless and operates at a cost for current of less than 20 cents per 1,000 gallons.
Cook Automatic Pumps are manufactured in three sizes:

Single Bellows Pump, Capacity 20 gallons per hour.
Two Bellows Pump, Capacity 40 gallons per hour.
Three Bellows Pump, Capacity 60 gallons per hour.

Each bellows unit is operated by an individual motor as a separate pump.

Illustrated circular on request.

Cook Electric Co.

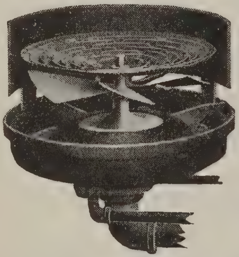
2700 Southport Ave. Chicago

siderable care to avoid strains that might open up the seams. All rivets of one-half inch and larger sizes should be driven hot, and the air pressure on the pneumatic riveters must be maintained at the pressure for which the tools are designed. All seams should be calked with a round-nosed tool and the tank subjected to a water or oil test before acceptance.

Should Last 25—40 Years

A well-constructed steel tank, properly maintained, should last 25 to 40 years, depending on the nature of the service it is in. Some of the older refineries in the country have tanks that are still in service after nearly fifty years, but the material in most of these is iron of greater durability than the generality of tank steel manufactured today.

Besides inlet and outlet connections, tanks are provided with flanges for water draw-off, steam fire lines, heating-coil inlet and outlet, roof vents, and foam lines—where that form of protection is used. Oil is usually taken from the tank through a "swing suction," i. e., the line after passing through the tank shell is connected inside the tank by means of a two-elbow swing to a length of pipe the open end of which can be raised or lowered by means of a cable passing through the roof of the tank. This allows oil to be drawn from any level desired in case of stratification. The swing suction is also valuable in case connections outside the tank are ruptured or valves become jammed, as the pipe may be raised until it is above the liquid level, thus preventing flow from the tank.



Rotary Oil Burners

for HOTELS, OFFICE BUILDINGS and HOMES

Wherever heat is required there is a Rotary Burner that will fit. From the small Burners for the homes to the large ones for the office buildings the Rotary is the same burner with the intense white flame. It is dependable and fool proof. Practically nothing to adjust and nothing to get out of order. Added to this is perfect and complete combustion even when low gravity oil is used. The Rotary will burn efficiently oil as low as 28 gravity.

WRITE FOR DETAILS TODAY

ROTARY MANUFACTURING COMPANY

1526 Santa Fe Avenue Los Angeles, Calif.
Eastern Manufacturer, 1934 Market St., Philadelphia, Penn.
Established 1908 Handled by distributors
Chicago, St. Louis, San Francisco, Oakland and others.

reliable!

Reliability in terms of Ohio fractional horse-power Motors is easily defined by this fact: "Of the thousands of Ohio Motors shipped each year, less than 1% have needed expert attention due to motor defects."

Such a performance record, year in and year out, is not a mere accident. It is the realization of the ideal of an organization that has been associated with the design and production of fractional horse-power motors for more than a quarter century.

That such Motor Reliability is vital to the reliable performance of the Oil Burner you manufacture and sell is beyond question.

Tell us your Motor Needs!

The Ohio Electric and Controller Co.

5920 Maurice Avenue **Cleveland, Ohio**

Steam lines for smothering are brought through the top ring and should have a gooseneck higher than the roof angle so that oil cannot flow into the steam pipes when the tank is completely filled. The lowest part of the branch before entering the main is fitted with a valve for draining condensate.

Vent In Roof

To allow for the expansion and contraction of the oil and the escape of vapors, a vent is provided in all tank roofs. It might be well to mention that the coefficient of expansion for fuel oil is about 0.00036, and if a tank is filled to too near its capacity with cold oil, it will spill over when the oil warms up. The vents must be of sufficient capacity to allow the outlet or intake of air at the maximum rate of pumping to or from the tank, with additional allowance for sudden change in temperature of the air space above the oil such as is caused by a shower on a hot day. The size of vent should also be checked against the amount of steam which could be put into the tank with the steam lines provided opened full. Valves or other means of obstructing vents are dangerous, as it takes only a very small pressure or vacuum to damage light tank roofs.

Use 40-Mesh Screen

To prevent any fire outside the tank from flashing back through the vents the latter should be protected with screens not coarser than 40 meshes to the inch. The diameter of

RECORDERS
DIAL-INDICATING THERMOMETERS
CONTROLLERS
OIL-TESTING INSTRUMENTS
The RED LINE MAKES IT EASILY READ
TAGLIABUE N.Y.
TAG
Insist on Mercury Thermometers with the TAG-Hespe RED Reading Column
SINCE 1768

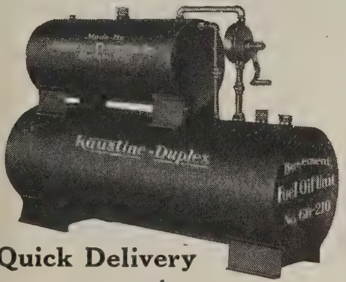
This broad red streak is **not a liquid,** but a strip of red **glass** at the back of the bore in which the mercury rises and falls. The mercury? Yes, this is a **mercury** thermometer, hence accurate—and now at last easily readable! The only easily-read mercury thermometer! Specify mercury thermometers with the TAG-Hespe Red reading column. They cost less in the long run. Send for Bulletin F.911.

C. J. TAGLIABUE MFG. CO.
18 TO 88 THIRTY-THIRD ST., BROOKLYN, N.Y.

this screen is increased so that the area of the actual openings is about 25 per cent greater than the area of the vent pipe. Regardless of what material is used, screens tend to corrode quite rapidly and clog, so that they should be frequently inspected and replaced.

Safety Valves In Lines

All lines running through the shell of the tank should have valves close to the tank to avoid the danger of a break between the tank and valve. Pumps delivering to or from oil tanks should be valved on both suction and discharge side, and pumps which deliver to tanks should be provided with a check valve to prevent flow from the tank back into the pump. When long lines run above ground and are left filled with oil,

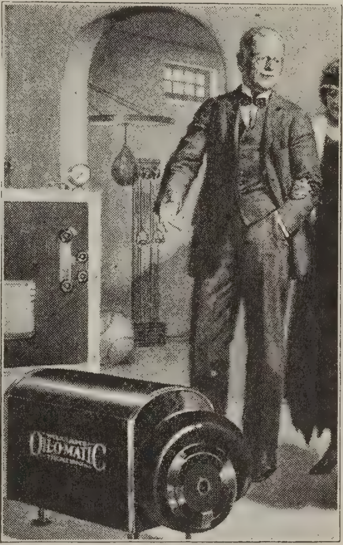


Quick Delivery
of
Kaustine Duplex Oil Burner Storage Tanks

Each tank equipped with quantity gauges. Will go through any basement door. Capacity Storage Tank 200 gallons. Capacity Gravity Tank 60 gallons.

Write or wire for prices.

KAUSTINE CO., INC.
BUFFALO, N. Y.
Mfrs. of all kinds of Fuel Oil Burner Tanks



SETS NEW RECORD
On Low Service Cost

OIL-O-MATIC, the remarkable new-type oil burner, by actual test, requires less servicing than a high grade washing machine. One service call for each 104 hours of running time was the best any electric washer could show. OIL-O-MATIC operated 1050 hours, ten times as long, with only three service calls. Two of those calls were for trouble not in the burner. The third was for a minor adjustment.

Get full information on the oil burner that has solved the burner problem. Some desirable territory still open for live dealers. Write today.

C. U. WILLIAMS & SON
Main Office and Plant
Bloomington, Ill.
Branches in all leading cities

WILLIAMS
OIL-O-MATIC
HEATING

the heat from the sun is often enough to cause expansion of the oil. If the valves at both ends of the line are closed, oil will be forced through the joints, either at the collars or valves, until pressure is released.

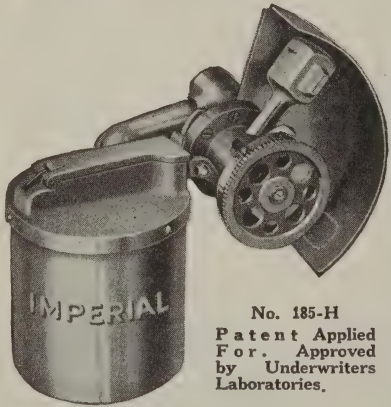
Steam Coils For Healing

Heating heavy oils to a temperature at which they will flow freely is done by steam coils in the bottom of the tank. For small tanks a flat coil over the entire bottom is used. For larger tanks where the cost of heating the whole tank would be great, a coil around the suction pipe only will generally be sufficient. In the latter case a box-type coil is most satisfactory. Either live or exhaust steam may be used. The flat-type coil should be supported a little above the tank bottom on a wooden framework so arranged that the piping will drain toward the outlet. Small fuel tanks are often insulated either by a hollow-tile jacket or some commercial insulating material.

Equipment Saves Time

Well-designed equipment for unloading tank cars will save considerable time and expense. Cars for heavy fuel are equipped with steam coils for reducing the viscosity of the oil in cold weather, and if the tanks are located quite close to, and below, the siding it is possible to unload by gravity. A 10-inch line should be used for gravity flow and sharp bends must be avoided. This will permit a tank car to be unloaded in about thirty minutes.

IMPERIAL OIL CONTROL AND SAFETY TRIP VALVE



Positive in operation, easy to install and meets all service demands better than any other valve.

Other Imperial Oil Burner Specialties are:

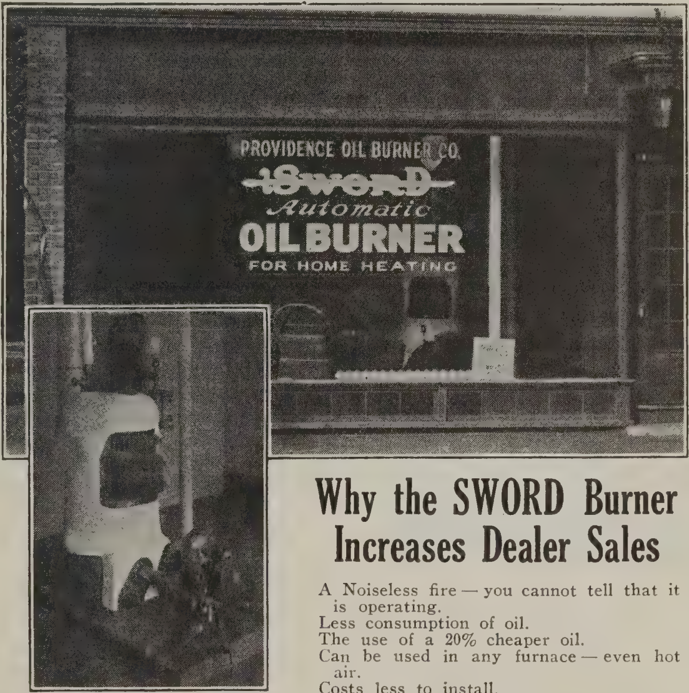
Safety Trip Valves
Indicator Valves
Oil Strainers
Shut-off Cocks
Needle Valve Drain Cocks
Copper Tubing
Oxygen Carbon Burning Outfits
Brass Pipe Fittings
Tubing Couplings
Angle and Globe Needle Valves

Write for catalog giving complete information about prices, sizes and installations.

No. 185-H
Patent Applied For. Approved by Underwriters Laboratories.

IMPERIAL BRASS MFG. CO. 1224 W. Harrison St., Chicago

The Revolutionary Burner
That You Should Know About



Dealer Display of Sword Automatic Oil Burner by Providence Oil Burner Company, Providence, R. I.

Why the SWORD Burner Increases Dealer Sales

A Noiseless fire — you cannot tell that it is operating.
Less consumption of oil.
The use of a 20% cheaper oil.
Can be used in any furnace — even hot air.
Costs less to install.
Full thermostatic control and all safety adjustments.
Very simple in construction — minimizes dealer service.

Write for Dealer Information

Sword & Kimber Company

4861 Stenten Avenue
PHILADELPHIA, PA.

Permanent Satisfactory Service

That is another one of the reasons why Chalmers Oil Burners enjoy the popularity they do today.

Every feature built up from standardized units, and backed up by our guarantee, Chalmers Oil Burners have earned a reputation that no amount of money could buy.

To become affiliated with this organization as a Chalmers Agent, offers a substantial profitable proposition to the right man.

Correspondence with substantial parties looking to permanent affiliations is solicited.

Chalmers Oil Burner Co.
Minneapolis :: Minnesota
Member of American Association of Oil Burner Manufacturers

TANKS
For Fuel Oil

Capacities 260 to 10,000 gallons

Popular sizes carried in stock

The Boardman Co.
Oklahoma City

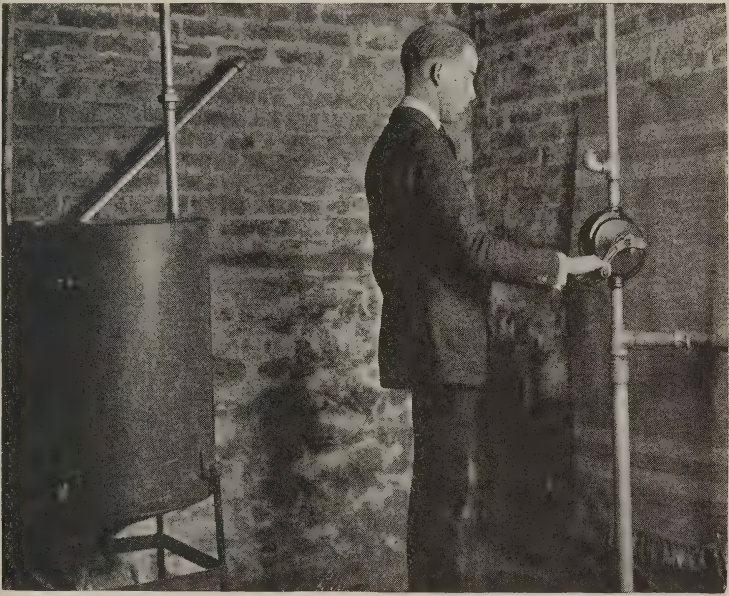
Write for Catalog and Prices

In providing flexible connections it should be remembered that if a 3-inch or 4-inch hose is used it will require several hours to unload a car. In most plants it is necessary to pump from the tank cars, or barges in case of water delivery, to the storage tanks. Since a steam line is run to the unloading point for the heating coils, a small duplex steam pump makes a simple and reliable installation and the exhaust is often used for heating the oil.

Tank cars are discharged through a 4-inch bottom outlet looking downward near the center of the car. The discharge valve is located inside the car and is operated from the dome. When unloading is completed all lines should be drained or blown clear. Heavy oil should never be left in a line after unloading, as in cold weather it will be found very difficult to start it moving again.

Sediment Settles Out

All fuel oil contains a small amount of sediment, and while it is only a fraction of one per cent of the oil delivered, it tends to settle out in the storage tanks, especially where they are heated, and deposit on the bottom. Moisture also gets into the tank through bad roofs, leaking steam coils, and the sweating of the underside of the roof. The water should be kept drawn off through a valve provided for that purpose, and the bottom sediment should not be allowed to accumulate to a point where it clogs the suction line. With some types of burners it is possible to take a small amount of the bottom sediment from time to time mixed with the fuel. For this purpose



Play Safe

Many cities have fire ordinances which prohibit oil burning systems dependent upon gravity for transferring oil from the outside storage tank to the basement. Whether you are in one of these cities, or not, your installations should eliminate this risk by including a Blackmer No. 9 Hand Pump. Your customers will appreciate your precaution.

Great care is taken in the manufacture of all Blackmer Pumps. Every one is carefully tested before leaving the factory.

Model 9, a Blackmer in every respect, has a capacity of 12 G. P. M. It is made in either solid iron or solid bronze with 1 inch pipe connections. Write for prices.

BLACKMER
ROTARY PUMPS

Made by
BLACKMER ROTARY PUMP CO., Petoskey, Michigan

tanks should be provided with high and low suctions, or preferably a swing suction.

Lindroth Burner Out Soon

A gravity-feed, blue-flame oil burner shortly to make its appearance on the market is the Lindroth oil burner, which has been developed by Chicago interests and is to be manufactured especially for use with hot water heaters and warm air furnaces for small houses. The head of the company making the burner is Leonard A. Lindroth.

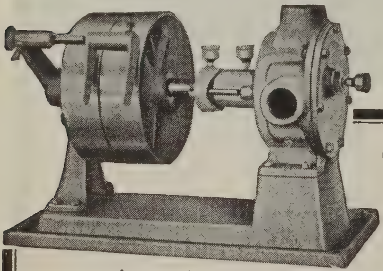
New CO_2 Recorder

Introduction on the market of a new CO_2 recorder known as the "Apex" has been started by the Uehling Instrument Company, Paterson, N. J. It is to be shown for the first time at the Power Show, to be held in New York during the first week in December.

Williams Building New Plant

Plans are completed for the first unit of a new plant that will be built in Bloomington, Ill., by C. U. Williams and Son, manufacturers of the Oilomatic oil burner. A five acre tract of land has been purchased as a site for the new structure.

R. P. Flower, who recently resigned from the Gill Manufacturing Company, Chicago, manufacturers of the Gill oil burner, is now associated with the oil burner division of the Cook Electric Company, Chicago.



VIKING PUMPS

Genuine Pumping Dependability

The VIKING Universal Pump is the most reliable pumping unit you can buy. It functions faithfully and without attention for years. There is nothing to wear or cause trouble. Should replacement ever become necessary, anyone can dissemble and reassemble it quickly. It possesses an improved pumping principle, thoroughly explained in the Viking catalog. May we not send you a copy?

Viking Pump Co., **Cedar Falls, Iowa**

Branches:
B. F. Schirmer Co. - - - - - - - - - 342 Madison Ave., New York City
Schirmer Co. - - - - - - - - - - - - - Finance Bldg., Cleveland, Ohio
Viking Pump Co. - - - - - - - - - 549 W. Washington Blvd., Chicago, Ill.
Norton Paper Goods Co. - - - - - - 719 Delaware St., Kansas City, Mo.
Viking Pump Sales Co. - - - . - - - 204 Grand Ave., Milwaukee, Wisc.
Walter O'Bannon Co. - - - - - - - - - - 519-21 E. First St., Tulsa, Okla.
Southern Engine & Pump Co. - - - - - - - - - - - - Houston, Texas
Menge Pump & Mach. Co. - - - 862 Tchoupitoulas St., New Orleans, La.
De Laval Pacific Co. - - - - - - - - - - 61 Beale St., San Francisco, Calif

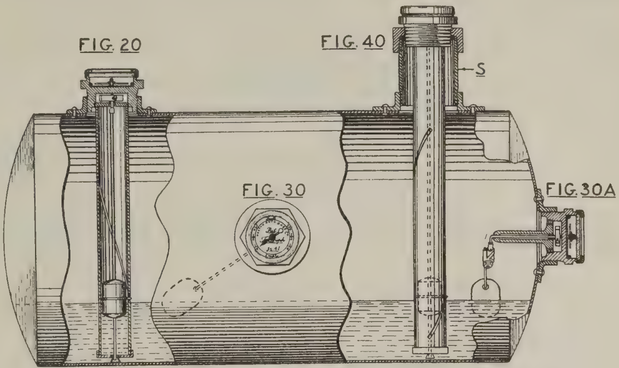


Fig. 20. Triumph No. 26 O. B. Upright gage, shown in section.

Fig. 30. Triumph Jr., No. 41 gage, applied to side of tank.

Fig. 40. Adaption of Triumph No. 26 O. B. gage for storage tanks buried underground.

Fig. 30A, Triumph Jr., No. 41 gage shown in section, applied to dome end of tank.

"Triumph"

Magnetic Oil Tank Gages
are
Durable -- Dependable — Safe

The indicating pointer on all models of the "Triumph" is a compass needle which is revolved by the turning of a magnet under a solid diaphragm. This makes the gage absolutely safe for use below the level of the fluid, for even if the glass becomes broken there is no opportunity for either the fluid or fumes to escape.

An actual test by the Underwriters' Laboratories showed that a pressure of 1500 *pounds was necessary to cause a rupture of the diaphragm.*

Eighteen years of gage manufacturing experience have gone into the perfection of this gage.

Write for details of Model Jr. No. 41 and Model 26 O.B. which are special designs for oil burning equipment and are listed as standard by the Underwriters' Laboratories.

Boston Auto Gage Company
248 Boylston Street Boston, Mass.

Chicagoan Invents New Burner

C. R. Smith of Chicago is the inventor of an oil burner for domestic use which he calls the Smith Oil-Gas Burner. The burner is not yet on the market, but arrangements are being made for its manufacture. It is said to utilize a new principle for applying pressure to the oil feed, differing from both the force and natural draft types.

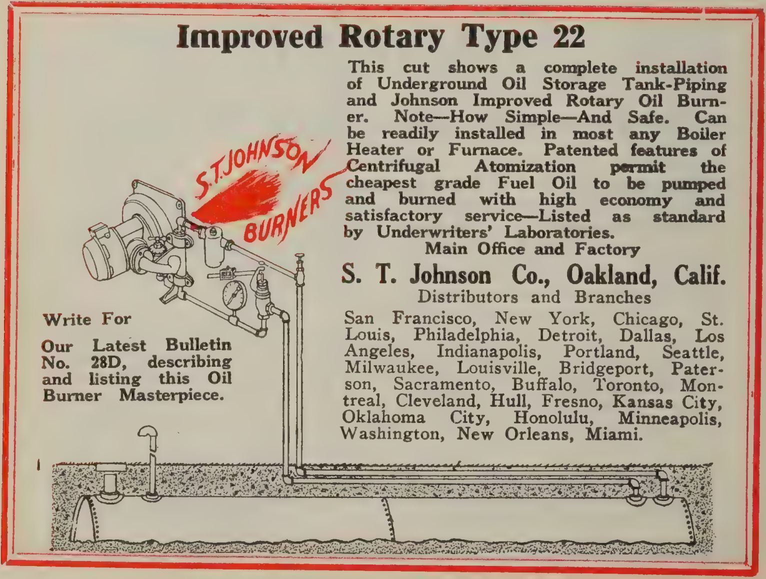
Issues Folder On Burner for Clay Products

Some information of general interest on comparative costs of installation and operation, and relative efficiency of steam and air for atomizing fuel is contained in a folder that has been issued by the Simplex Tool and Appliance Company, Los Angeles, Cal., manufacturers of the Bullum burner. This burner is made especially for burning clay products, with either oil or gas.

Introduce New Pyrometers

A complete new line of indicating and recording Pyrometers together with the usual thermocouple accessories were recently introduced by the Republic Flow Meters Company, Chicago, Ill.

New folders on the Breeding oil burner have been issued by the Breeding Oil Burner Corporation, Cincinnati, Ohio. The Breeding is a "pot-type" automatic burner using a forced draft.


Improved Rotary Type 22

This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—And Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

Main Office and Factory

S. T. Johnson Co., Oakland, Calif.

Distributors and Branches

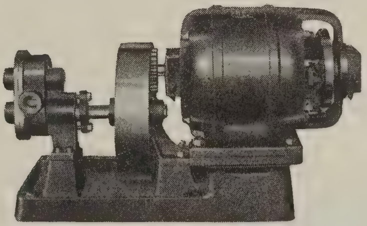
San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Paterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.

Write For

Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.

REG TRADE MARK
TRAHERN
REG U.S PAT OFF

PUMPS
FOR DOMESTIC AND INDUSTRIAL OIL BURNERS



Trahern Rotary Gear Pumps for transferring liquid fuel are made in sizes to meet the requirements of both large and small installations.

Hand Pumps for Domestic installation have convenient suction and discharge openings, operate exceptionally easy and produce 12 gallons per minute at 100 R.P.M.

Capacities of power outfits range from 1 gallon a minute to the needs of the largest industrial installations.

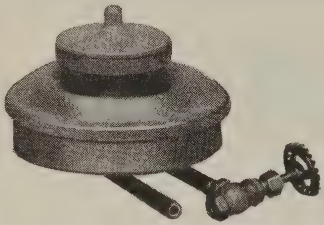
Let us help you select the proper pump for your burner. Our Engineering Department is at your service. No obligation.

LEADER-TRAHERN COMPANY
Decatur, Illinois

Plants: Decatur and Rockford, Illinois

New York City
21 E. 40th St.

Chicago, Ill.
327 S. LaSalle St.



The "Superior"

New Invention. Combines Water, Steam, Air and Oil-Gas. Powerful White Flame. Gravity Feed. No Motors. Smokeless, Noiseless, Sootless. Low Price. Five Sizes, For Every type and Size Furnace, Boiler, Stove. State and Co. Agents wanted.

SUPERIOR OIL-GAS BURNER CO.
453 N. Racine Ave., Chicago

KELLOGG COMPRESSORS

Air Compressors.
Vacuum Pumps.
Special Oil Burning Equipment

Our engineering and production departments are at your service in increasing your output of Oil Burners.

Send Direct

KELLOGG MANUFACTURING COMPANY

Rochester, New York

River Steamers Turning to Oil Fuel

Many oil burner and Diesel engine installations are being made on steamboats running on inland rivers, displacing the old coal burning boilers, according to a recent announcement by the Smoke Abatement League. Speaking of the installation of oil engines in a new excursion steamer at Cincinnati, Michael Silbernagel, superintendent of the league, said:

"Owners of boats which ply in the river trade will watch the operation of the new engines, and if they prove a success, I look for the complete standardization of all river craft with this type of fuel. This type of engine, if properly fired, will eliminate entirely all smoke. Our greatest trouble with steamboats has been when they are at the landing point getting up steam. Clouds of dense black smoke emanate from their stocks to the detriment of that portion of the city lying close to the levee."

Announces New Burner

An announcement from the Grand Rapids Textile Machinery Company, Grand Rapids, Mich., is to the effect that they have developed a domestic oil burner which the expect to start marketing soon. H. A. Shields is president and general manager of this company.

According to a recent announcement, the Oil Well Supply Company, Pittsburgh, Pa., has taken over the distribution of oil burners in the oil fields for the National Airoil Burner Company, Philadelphia, Pa.

A Better Fuel Oil Tank That Costs No More

Three features distinguish this Morrison fuel oil tank assembly from all others. 1—The supply tank is oval so it clears any ordinary door and can be installed in the basement. 2—It is a compact unit with 250-gal. supply tank, 50-gal. auxiliary tank and pump for filling the smaller tank. 3—In every detail you find the uniformly high Morrison standard of manufacture.

With all its advantages, it is not high priced. It represents real economy in installation as there is no excavating nor cutting through basement walls. Goes right into the basement.

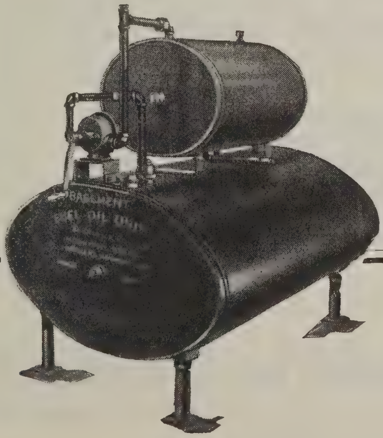
The tanks are of heavy 14-gauge black galvanized steel, absolutely leak-proof. Securely joined with steel bands and equipped with hand piston pump, connecting pipes, overflow pipe, measuring pipe and gauges.

Investigate before you buy your fuel oil burner. Write for literature. Price complete $120.00. Magnetic Gauge $5.00. Pumps $12.00.

Morrison Bros.

"OIL EQUIPMENT HEADQUARTERS"

Dubuque, Iowa



Accessible

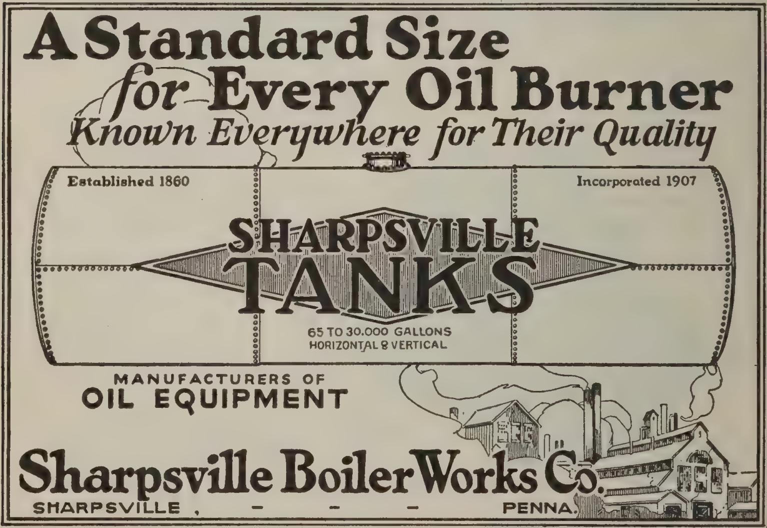
Why bury the tank underground or make an "eyesore" alongside the house. This new unit all goes down into the basement where possible loose connections may be easily located. Conforms with Underwriter Laboratories rulings.

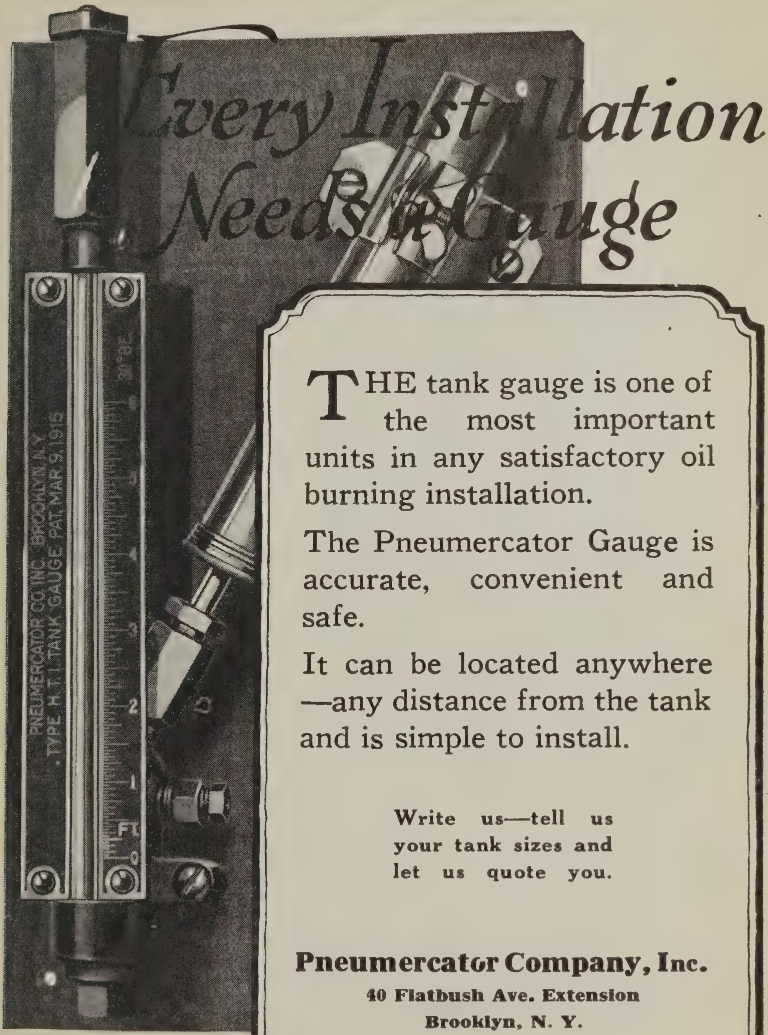
A. A. O. B. M. Officer To Address Convention

Edward P. Bailey, president of the American Association of Oil Burner Manufacturers, and treasurer and general manager of the National Airoil Burner Company, Philadelphia, will address the fifth annual convention of the American Petroleum Institute, which will be held in Fort Worth, Tex., December 9, 10 and 11, on "The Problem of the Oil Burner Manufacturer." Wallace C. Capen, president of the Home Appliance Corporation, St. Louis, first president of the A. A. O. B. M., will also address the convention, his subject being, "The Sale and Service of Domestic Oil Burners."

These speeches will be delivered in a special group meeting, held during the Institute's main program, under the subject of "Heating the Home with Oil." O. P. Keeney, president of the National Petroleum Association, will also speak before this group, his subject being "The Place of Furnace Oil In the Petroleum Industry." The great interest being shown by the entire oil industry in the subject of oil burning is manifested by the prominent place given it on this program of the largest and most respected association in the oil industry. A large attendance at the convention is expected.

Courses designed solely for people interested in oil burning are being planned by the Hays Institute, Chicago, Ill., a combustion engineering school, according to a recent announcement.


A Standard Size for Every Oil Burner
Known Everywhere for Their Quality
Established 1860
Incorporated 1907
SHARPSVILLE TANKS
65 TO 30.000 GALLONS
HORIZONTAL & VERTICAL
MANUFACTURERS OF
OIL EQUIPMENT
Sharpsville Boiler Works Co.
SHARPSVILLE, - - - PENNA.


Every Installation
Needs a Gauge
PNEUMERCATOR CO. INC. BROOKLYN N.Y.
TYPE H.T.I. TANK GAUGE PAT. MAR. 9. 1915
FT
0
1
2
3

THE tank gauge is one of the most important units in any satisfactory oil burning installation.

The Pneumercator Gauge is accurate, convenient and safe.

It can be located anywhere —any distance from the tank and is simple to install.

Write us—tell us your tank sizes and let us quote you.

Pneumercator Company, Inc.
40 Flatbush Ave. Extension
Brooklyn, N. Y.

Chicago Burner Men Meet

Chicago oil burner manufacturers and others interested in oil burning met at a luncheon at the Hotel Morrison, Chicago, on November 19, to consider the idea of reviving a previous organization which has been suffered to pass into a state of inactivity.

Shipping Board Awards Fuel Oil Contracts

The Shipping Board has awarded contracts for 50,000 tons of Navy specification bunker oil to the British Mexican Petroleum Company, which recently secured the contracts with the Cunard lines. The quantity contracted for is a six and one-half months' supply and is to be delivered to Shipping Board vessels as required. The Pacific Coast contract has been divided. The Pan-American Petroleum & Transport Company has secured a contract for 4,000,000 barrels to be delivered at San Pedro harbor at $1.29 a barrel. The General Petroleum Company has secured an order for 500,000 barrels to be delivered at San Francisco at $1.35 a barrel.

Smith Made Director

E. J. Smith, president of the Gill Manufacturing Company, Chicago, has been elected a member of the board of directors of the American Association of Oil Burner Manufacturers, filling the unexpired term of R. P. Flower, who recently resigned the office when he severed his connection with the Gill organization.

THE BASEL TYPE E-3 HEAT REGULATOR

is now equipped complete, with Thermostat, magnetic control, mercoid switch for operating motor, valve, automatic cut-off, of both oil and motor from overflow of oil to trip bucket, Thermostat control and automatic cut-off each being independent of the other.

Hand control independent of either the Thermostatic control or automatic cut-off.

Removable strainer, air seal, enclosed in steel case.

In fact everything in a nut shell. What more do you want? For Mechanical or Gravity Feed burners.

Basel line of valves and heat regulators are made in seven types. Two of which are approved and listed as standard by the Underwriters Laboratories of the National Board of Fire Underwriters.

All frictionless and packingless.

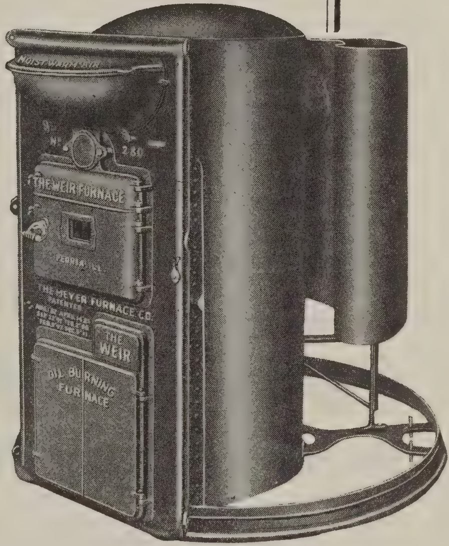
The Basel line of valves and heat regulators are not just ordinary valves. They mean advanced theories in Heat Regulators and Valves and Valve control construction.

Valves and valve control is our hobby. Literature on request.

911 Mulberry St. **BASEL MANUFACTURING COMPANY** Kansas City, Mo.

The WEIR
Oil-Burning Furnace

the one
proven
warm air
furnace
for oil
burning



GET THE FACTS

Write
The Meyer Furnace Company
Peoria, Illinois

NO EXTRA FIRE HAZARD WITH OIL WHEN PROPER CARE IS TAKEN

(Continued from page 21)

Before starting to make an oil burner installation, the first order of business should be to test the chimney and to remedy any defect located therein. Defective smoke pipe should be replaced, and in case the piping is in close proximity to woodwork, special protection should be provided to prevent ignition by the sustained smoke stack temperatures that may be so easily maintained with the oil burner. Ceilings and combustible side walls should be protected as recommended and the installation made in full accord with the regulations. In the case of oil burners of a type employing electrical circuits, the National Electrical Code should be followed in the installation of the electrical wiring and connections.

Should Follow Directions

Having thus rather hurriedly passed over the procedure of installation, we warn the user that he may have trouble before him, if he does not follow directions. The manufacturer of standard equipment furnishes with each burner, a direction card suitable for mounting near the burner, in which the procedure to be followed in operating and maintaining the burner is carefully outlined. It should be seen to that this direction card is mounted in a conspicuous place and that the owner or operator of the burner is instructed to study and follow the directions.

We often hear the statement made that fuel oil is perfectly safe—that it will not burn if a lighted match is

Oil Burner Castings

IRON AND BRASS **UNFINISHED OR MACHINED**

Various parts of oil burners require different qualities of iron for their particular use. Some require close grained leak proof or heat resisting qualities; some require soft iron for a large amount of machine work; some can be rough castings where finish is of no particular importance.

Our five foundries and machine shop insure you of our ability to take care of your requirements in every respect.

Chicago Hardware Foundry Co.

North Chicago, Illinois

"Executive Circulation"

Those two high-sounding words mean this:

The
Oil Trade
Including Oil Trade Journal and Oil News
MARKETING · PRODUCING · REFINING

with 5000 circulation a month, reaches the buying executives of the oil industry—and no one else!

Being a monthly, The Oil Trade is read thoroughly—there's no waste.

Advertising rates haven't yet caught up to value, but they will soon, we promise you!

For complete descriptive booklet, "The Editor's Story of What he is Doing" address

Leod D. Becker, ***Editor***
The Oil Trade
350 Madison Ave., New York

PETROMETER
Fuel Oil Gauges
Are adaptable to all Tanks
Price, $5.00 to $20.00
Porter Electric
Carburetor Company, Inc.
Manufacturers of Gauges
35 Purvis St. Long Island City, N.Y.

The guide and text book for industrial users of fuel oil is
"Fuel Oil in Industry"
By Stephen O. Andros
Price $3.75
FUEL OIL for Heat & Power
350 Madison Ave. New York, N. Y.

BRASS FITTINGS
for
OIL BURNING
SYSTEMS

Let us estimate on your requirements for standard or special brass pipe and tube fittings.

COMMONWEALTH
BRASS CORPORATION
5781 Commonwealth Ave.,
DETROIT

thrust into it. Of course, it is hardly necessary to go into a lengthy discussion of this phase of the domestic oil burner problem, but no false impression should be permitted to be the cause of some misinformed user paying the penalty for his misplaced confidence.

Caution Is Necessary

It is not desired unduly to stress the hazards of the lower grades of liquid fuel generally used in oil burners, but on the other hand, there is no excuse for giving such a false sense of security that oil is allowed to escape and accumulate without restraint, with little attention paid to the temperature and perhaps with no knowledge of the actual flash point of the oil. So long as the temperature of the oil is kept below the flash point, the danger is not great. On the other hand, oil may be overheated, and there is also the possibility of a low flash oil being accidentally substituted for the 100° Fahrenheit flash test oil specified as a minimum for use in domestic oil burners.

Beckwith Representing Tank Company

Charles F. Beckwith, who for several years has been sales manager for the Farr Hydraulic Systems, Inc., of New York, is eastern representative of the Oil Products Appliance Company, Maywood, Ill., manufacturers of oil burner tanks and filling station equipment. An earlier announcement in **Fuel Oil** stated erroneously that the Farr Company was the eastern representative of the Oil Products Appliance Company.

What the public wants

Oil burner satisfaction cannot be complete until the question of ignition and control is properly answered—relieving the user of all anxiety and worry of upkeep. Jefferson Equipment is answering this question.

Jefferson Coils deliver an intensely hot spark which gives positive ignition to gas pilot or fuel direct; thus eliminatng possibility of oil or pilot gas accumulating.

Jefferson Transformers, furnishing power for thermostatic and relay mechanism, insure constant, even temperature and do away with human uncertainty.

Many prominent manufacturers of oil burners are using Jefferson Electric Ignition and Control as standard equipment—an indication of its superiority. Our engineers will gladly cooperate with you in adapting our equipment to your needs.

A list of manufacturers using Jefferson equipment will be sent upon request.

Jefferson Electric Mfg. Co.
434 S. Green St., Chicago

Jefferson Electric
Ignition and Control

Consulting Page

Q. We have two 250 h.p. vertical boilers which we are using for driving a mill and which are heated by waste gases from our steel furnaces. On account of having to dampen the furnace quite frequently, it is impossible for us to keep up steam, so we are planning to use an oil burner as an auxiliary for making steam while the furnace is dampened. Can you recommend any book on oil burning which shows the installation of tanks, pumps, etc., from which we may obtain information that will be helpful in making this installation?—W. F., Danville, Pa.

Ans. We have three very good books that would be helpful to you in making the change from your present heating methods to the use of fuel oil. They are: "Oil Fuel for Steam Boilers," by Rufus T. Strohm, $2.00; "Fuel Oil in Industry," by S. O. Andros, $3.75; and "Burning Liquid Fuel," by W. N. Best, $5.00. Each gives detailed and practical information on oil burner installation and operation and they are among the best books that have yet been written on this subject. From your description of your boilers, we would advise getting "Oil Fuel for Steam Boilers."

Q. One of our men has been asked to make an address at the American Petroleum Institute convention in Fort Worth, Texas, in December, on the subject of oil burners for domestic use. Can you give us some interesting suggestions for incorporation in an address of this kind?—C. W. R., New York, N. Y.

Ans. We can suggest no more than that you refer to your file of **Fuel Oil** and pick out the facts and news which seems of most importance. Some of the articles we have used contain very good material for papers of this kind. In the May issue, "The Simplification of Oil and Burners," by Arthur E. Shaw, and "The Importance of Fuel Oil Specifications," by E. S. Harmon, in the July issue, are examples.

Q. Can you tell us of any firm that manufactures a radiant fire-place burner which burns kerosene?—K. S., Seattle, Wash.

Ans. We know of no such firm. Can some **Fuel Oil** reader give us this information?

Q. We are desirous of knowing the number of patents which have been issued on domestic oil burners and also whether or not you have anything on their history; that is, where they were first developed and about how long ago.—C. W. R., New York, N. Y.

Ans. It has been estimated by both oil burner authorities and several people well informed on matters pertaining to U. S. patents, that to date there have been between sixteen and seventeen hundred oil burner patents issued in this country.

A good history of oil burners and oil burning was contained in the October issue of **Fuel Oil,** on page 23, under title "Glimpses into the History of Oil Burning."

Q. On page 46 of the July Fuel Oil a reference is made to the Socony Arrow Oil Burner. Who manufacturers this burner and where is the company located? —W. L. L., Wappingers Falls, N. Y.

Ans. This burner is made by the Socony Oil Burner Company, 11 Broadway, New York City.

Q. We are replacing our two 12,000-gallon fuel tanks with larger ones and we want to use the smaller tanks for gasoline storage. We have been told, however, that these tanks will have to be cleaned first or they will discolor the gasoline. What is the usual method of cleaning such tanks?—H. R. F., Sydney, Ohio.

Ans. A large American oil company follows this routine with some success when wishing to clean crude or fuel oil tanks so they can be used for gasoline: First steam them thoroughly with as live a steam as can be conveyed to them by pipe or hose; then scrub out with a heavy broom or swab as much of the heavy refuse as possible; then wash down with very hot water, under as high a pressure as possible; then swab out again and, finally, wash out with some of the gasoline itself.

Even this procedure, thorough as it sounds, does not keep the first few batches of gasoline from becoming a trifle defiled, according to our consultant. It is also possible that it may discolor the gasoline, the heavy oil running out of the cracks and seams from which it is imposible to wash it.

Fuel Oil Markets

Industrial Activity and Cold Weather Stimulate Oil Market

THE upward, post-election swing of industry was beginning to extend its influence into such commodities as fuel oil before the end of the month and as this is written the fuel oil market is very strong, with no indication of weakness for some time to come. This strength extends as well through the line of lighter grades burning oils up to and including high gravity kerosene.

Most Burning Oils Strong

Most grades of oils for burning have ruled strong throughout the fall in spite of falling crude oil markets. Crude prices generally are considered to have reached bottom; in fact, there have been increases in premiums and even in actual quotations at some places in the last thirty days.

In contrast with the situation existing at this season in the last few years, heavy fuel oil prices are leading the advances of burning oil prices. Common quotations for 24-26 grade fuel oil early in the latter half of November were from $1.05 to $1.10, with some refineries unable to deliver at any price. This reflects, in the opinion of some of the best posted analyst of the industry, the results of the oil cracking processes which have been utilized intensively in the refining industry, and more the past year than ever before.

The school of market students which has predicted much lower prices for oil for burning for the winter of 1924-25 is being deserted. Delayed approach of the winter season, together with reports of a vast over-production of crude oil, is jointly responsible for many buyers' failing to place orders earlier. Now they are finding many sources of supply sold up considerably in advance. Oil consumption is more nearly approaching the level of production than for many months. Oil production is down approximately 100,000 barrels a day from its high point of 1924. In addition to all this one must remember that the consumption of fuel oil and distillates is larger than ever before.

Conditions Different This Year

The entirely different conditions obtaining in the fuel oil supply situation this year and last is illustrated by the fact that whereas the United States Shipping Board last year was able to have oil placed in its hands in large quantity at 95 cents a barrel, this year the best price offered is around $1.29. A factor which may have an effect on the gas oil market

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High and Low Voltage Room Thermo Switches, Boiler Safeties, Time Limit Switches, Magnetic Valves, etc. A complete Automatic Line.

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BELOIT, WISCONSIN

Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers". It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York

Branch Offices in the Larger Cities

is the expected entrance of numerous gas companies into the market for oil, the report being to the effect that they will do this soon. Figures on railroad consumption show that the roads are taking more oil than at this time last year by a slight amount. However, numerous large industrial buyers refuse to be pried from the rut of hand-to-mouth buying.

Increased Domestic Demand

Oils for domestic consumption were beginning to feel increased demand as the colder weather arrived in the later part of the month. A very slight slackening of the demand for distillates had been felt in the first part of November, but it was generally believed among refiners that this would be overcome by colder weather and the fact that many jobbers are handling burning oils who never before carried them. This is especially true in outlying districts where communities are of smaller size. Jobbers who up to this year have been unfriendly to the idea of handling furnace oil have in many cases decided to give it a trial. They report they are finding, on surveying the field, a surprisingly large number of users, and also are encountering a definite number of householders who have held off buying oil burners because they could discern no satisfactory distribution of oil in their localities.

A marked tendency is toward reducing grades of burning oils to the fewest possible. As has already been stated here, one large refined oil distributor in the Middle Western territory has concentrated on a single grade said to be adaptable to the

Just as An Example:

Several hundred extra copies of FUEL OIL were printed in September—the First Annual Home Heating Number. Three weeks after date of issue the reserve supply was exhausted and the office contained but six salable copies. At present there are unfilled requests for several hundred copies, with more coming in daily. Many of these have been made necessary because the first copy received was lost or mislaid.

Every issue of FUEL OIL is full of vital information and it is to assist our readers to safely retain this information, by making a book out of his copies, that we are offering—at cost—the

Fuel Oil Binder

It is substantially finished in heavy black cloth and leather, and is lettered in gold. It holds from one to twelve copies of the magazine and is made to easily permit the addition of a new copy each month. The price is $1.40, check to accompany order.

In one year copies of FUEL OIL for any month in 1924 will be unobtainable and invaluable. Save yours the easy way. Send your check today and be sure.

FUEL OIL

for Heat and Power

350 Madison Avenue, New York, N. Y.
20 East Jackson Blvd., Chicago, Ill.

great majority of burners, and is selling no other. It is not too much to expect that this policy will find more and more favor among both consumers and distributors of furnace oils.

Kerosene was comparatively weak a few days in the first half of the month but was showing renewed strength toward the close.

Current Tank Car Prices

The following prices in tank car lots, f. o. b. Group 3 refineries, or adjusted to that basis, were quoted as of November 17, shipment in sellars' tanks:

Fuel oil, 24-26 gravity, low sulphur, bbl.	$1.05 -1.10
Fuel oil, 26-28 gravity, low sulphur, bbl.	1.10 -1.15
Fuel oil, Smackover, bbl.	1.02½-1.07½
Gas oil, 32-26 gravity, gal.	.03 - 03⅛
Distillate, 36-38 gravity, gal.	.03½-.03⅝
Distillate, 38-40 gravity, gal.	.03⅝- .03¾
Kerosene, 41-43 gravity, gal.	.04½- .04¾
Kerosene, 42-44 gravity, gal.	.04⅞- .05

Fuel Oil Production Drops in September

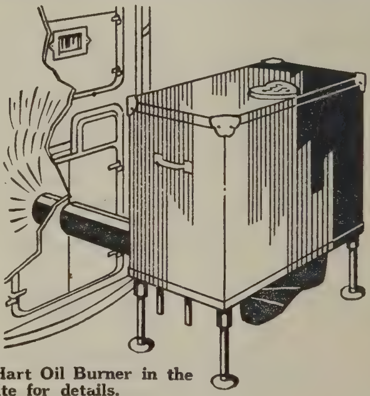
Production of gas and fuel oils in the United States during September amounted to 1,114,000,000 gallons, a daily average of 37,130,000 gallons, and a decrease from the previous month of 1.4 per cent, according to the Bureau of Mines report. During the same period the domestic demand held steady at about 105,000,000 gal-

A Carload of Oil Burners

One of the largest companies in the East, (name on request) engaged in the sale of Heating Equipment, recently placed an initial order with the Hart Oil Burner Co. for 100 Burners.

Engineers from this company finally decided upon the Hart Oil Burner because of its high efficiency, excellent mechanical design and rugged construction.

Designed and built by engineers with 34 years of manufacturing experience, the Hart Oil Burner is the last word in manufacturing progress.



Dealers: The franchise to sell the Hart Oil Burner in the community is valuable. Write for details.

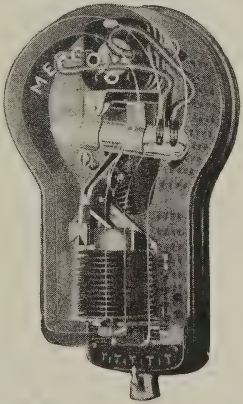
Hart Oil Burner Co. "HART HEAT"

Department 101 **Peoria, Ill.**

FEDERAL MERCOID THERMOSTATS

For direct control of domestic burners

Simplicity, accuracy and durability are the outstanding features of the Federal Mercoid line of Controls, all contacts being made within a sealed glass tube, containing inert gas and mercury.

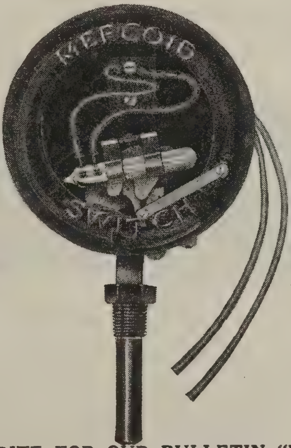


No exposed conducting surfaces, no corrosion, no open arc, no oxidation. Mercoid Tube actuated by bellows containing expansive liquids or gases. Scale 56 to 80 degrees F., with a guaranteed operating differential of 2 degrees.

FEDERAL MERCOID BOILER CONTROLS

For Steam and Hot Water Boilers, Vapor Heating Systems and Hot Air Furnaces

Mercoid controls will safely carry loads up to 10 amperes at 110 volts or 5 amperes at 220 volts, either A.C. or D.C., eliminating the use of remote controls on motors of one horsepower or less.



Mercoid Controls are especially adapted to electrically operated and controlled oil burning equipment, also refrigeration, general domestic and industrial work.

WRITE FOR OUR BULLETIN "E."

THE FEDERAL GAUGE CO.

564 West Adams Street
CHICAGO, ILLINOIS

lons total, about 3,500,000 gallons daily average, due probably to the even and warm weather experienced during that month. Exports decreased also, dropping from about 150,000,000 gallons total during August to approximately 145,000,000 gallons in September. The decline in production more than offset the export decrease, however, and the stocks on hand dropped 18,000,000 from the previous month to a total of 1,641,000 000 gallons on hand October 1. These stocks represent approximately 50 days' supply at the present rate of domestic consumption.

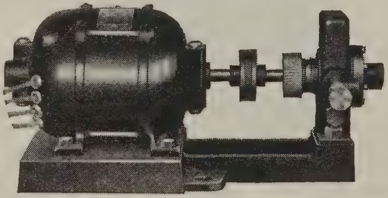
If the consumption curve follows the same general plan of former years, it has begun to rise sharply in October and if production continues to decline for several months, as has been predicted, stocks will be eaten into and lessened considerably by the first of the year.

Last year at this time stocks were much less than they are at present and production was proportionately smaller, but the gap between demand and the stocks on hand was wider.

Largest Newspaper Plant Uses Oil Burners

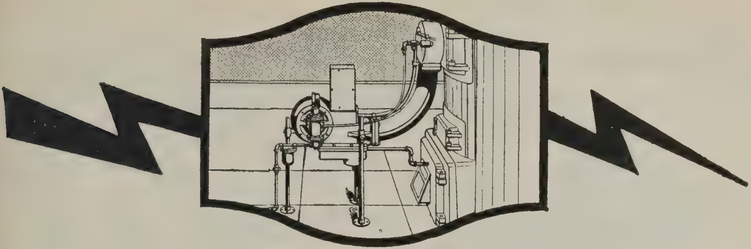
What is claimed to be the largest newspaper plant in the world was completely equipped with oil burners recently when National Airoil Burner Company, Philadelphia, finished an installation in the new home of the Philadelphia *Evening Bulletin.* Besides being used for building heating purposes, oil burners can be very well adapted to type-metal melting crucibles, stereotype machines and other printing plant equipment.

"PAUL" Type "RRO" Oil Pump



The "PAUL" Type "RRO" Oil Pump is a revolving reciprocating pump with double acting piston of positive displacement, the clearance is zero. It is positive in action, capable of working against high suction lifts, is perfectly balanced, noiseless in operation and will handle light or heavy oils. These are a few of the many features which make the "PAUL" Type "RRO" Oil Pump ideal for use in connection with domestic or industrial oil burner installations.

FORT WAYNE ENGINEERING & MFG. CO.
Home Office and Factory
FORT WAYNE, INDIANA
Ask for Bulletin No. 5030



The Truth About Electric Ignition

Electric spark plug ignition of oil for heating purposes was successfully achieved more than 15 years ago.

In June 1919, this principle was first applied to domestic oil burners. Its practicability was demonstrated in the winter which followed.

The development of electric ignition for oil heaters was carried out by the engineers who designed the Electrol Automatic Oil Burner. When false or misleading claims are made that electric ignition in oil burners has now been perfected or developed for the first time by any one, this can be characterized in only one way.

Yet these claims are natural enough. The price of pioneering is always imitation. The penalty of leadership is always the envy of those who only follow.

When false claims are made in advertising (as they have been made concerning the development of electric ignition for oil burners), we must remind you that "truth in advertising means honesty in product."

HOME APPLIANCE CORPORATION
2818 Locust Blvd. St. Louis, Mo.

The Electrol Automatic Oil Burner is the perfected oil burner with the added essential feature of entirely automatic electric ignition. Some desirable territory is still available. Write for particulars.

(Scott-Newcomb System)

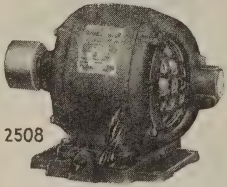
ELECTROL

Electric Ignition Quiet Operation

AUTOMATIC OIL BURNER

Emerson Motors

Single Phase, Polyphase and D. C.
(Interchangeable)



2 H. P. and Smaller

For thirty years we have specialized in producing motors in these sizes

The Emerson Electric Mfg. Co.

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(We sell no motors at retail or to the user)

WEBER BROS. METAL WORKS

Oil B Dept.
108 N. Jefferson St. Chicago, Ill.

Are equipped to make to your specifications metal floats, trip buckets, special sheet metal work, stamping and machine products.

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Aeroil Burner Co., Inc.

Union Hill, N. J.

Manufacturers of
Kerosene Thawing Outfits
Flame Concrete Heaters
Portable Water Heaters
"Smokeless" Asphalt Kettles
Portable Oil Burners and Torches
Lead Melting Furnaces

AGENTS WANTED

OIL BURNING RESEARCH

(Continued from page 16)

During this period of operation, after all conditions had become constant, a measured run was made. An Orsat measurement of the flue gases collected during the run indicated that 6.3 times the theoretical amount of air required for combustion of the oil consumed passed through the combustion chamber, was heated and passed out of the flues. This indicated an efficiency loss of over 50 per cent. Calculation from data collected showed the efficiency of the burner under these conditions to be actually 48.3 per cent.

Air Supply Gauges CO_2

Without changing any other condition, the air supply was reduced until the flame assumed a dull red color with smoky tips. The flame had the effect of expanding until it almost completely filled the combustion chamber. A measured run under these conditions indicated a carbon-dioxide content of 10.6 per cent with an overall efficiency of 70.4 per cent. As is later shown in a typical run hereafter recorded, it was possible to increase the carbon-dioxide content and efficiency by proper control. These simple facts demonstrated to the service man the necessity of regulating the air supply and more satisfactory results have since been obtained.

Before going further into the results of systematic observation and study of the burners operated under the widely varying conditions to which they are subjected in practice, it may be interesting to the reader

Bird Oil Burner

Some Good Territory left for the right parties.

Three Years of Proven Success

A high class burner at a price one can afford.

Hundreds of Bird Burners are in use all over the country. Their successful operation has won for them an enviable reputation among home owners. It is a burner which will meet your every expectation, and assure you of satisfaction.

Write Today For Information

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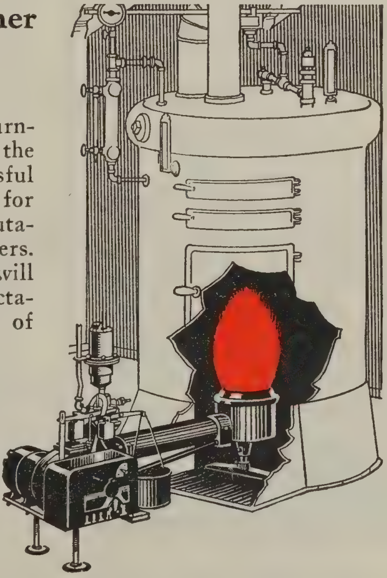
Minneapolis, Minn.



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25 Years Experience in Combustion and Control
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OIL VAPOR BURNER
Listed as Standard by Underwriters Laboratories
Tested by Iowa State College, Ames, Iowa, and proved highly efficient.
They last and satisfy.
Reliable dealers wanted
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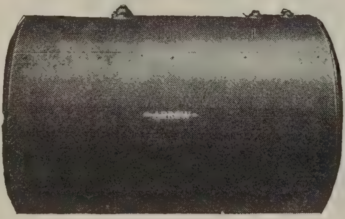
Unconditionally
Guaranteed
Oil Storage Tanks



The Novelty Steam Boiler Works Co.
929 S. Howard St. BALTIMORE, MD.

to learn a little about the apparatus used in getting the data. The equipment finally adopted after careful investigation into the more recent testing methods coded by the engineering societies and used by thermal research laboratories is shown in Diagram 1. For the purpose of flexibility, to make possible the testing of burners of varying capacities, a No. 531 steam boiler manufactured by the American Radiator Company was chosen. The large 31-inch fire box makes it possible to construct various types of combustion chambers necessary in the general study of the problem. All changes in the chamber made while testing burners of varying capacities introduce variables which are carefully considered in each case. The boiler exhaust opens directly through a valve into the hot well. By careful calibration of this valve, it is possible to read the actual capacity of the burner in square feet of radiation directly from the valve dial at the boiler pressures at which the calibration is made. The gauge calibration is usually made at about two pounds pressure. It was found necessary to use a water separator in the exhaust line, inasmuch as the steam exhaust is practically dry, due to the fact that there is little or no surging in the boiler when operated at low pressures.

Two Oil Supplies

The fuel oil is fed to the burner installed in the boiler from two separate supplies, one containing an unknown weight of oil, the other containing a carefully weighed supply.

Valves are provided so that the oil may be taken from either supply or switched from one supply to the other without interrupting the operation of the burner. A standard needle-valve control equipped with a calibrated dial is installed near the furnace so that the oil supply may be controlled without difficulty.

Water Tank Calibrated

The water is supplied from a large calibrated tank through an automatic constant level valve to the boiler. The calibrated tank is filled from the city water supply which builds up a pressure during filling sufficient to operate the constant level valve, keeping the boiler filled during low steam pressure operation. The line connecting the calibrated tank with the city water-main is equipped with two valves to insure against leakage through the main. In instances where the boiler is operated at high steam pressure, compressed air is introduced into the calibrated tank to provide the excess pressure necessary to operate the constant level-valve.

Thermometers and thermometer-wells are provided for determining the temperature of the feed water, exhaust steam and flue gas. Thermometers are supplied for securing the room and outdoor temperatures. A Bristol recording pyrometer is provided for exploring the temperatures of the combustion chamber and flame areas. A flue sampling nozzle is introduced just inside of the smoke-pipe opening into the smoke-hood of the furnace and is connected by a ¼-inch iron pipe to a water

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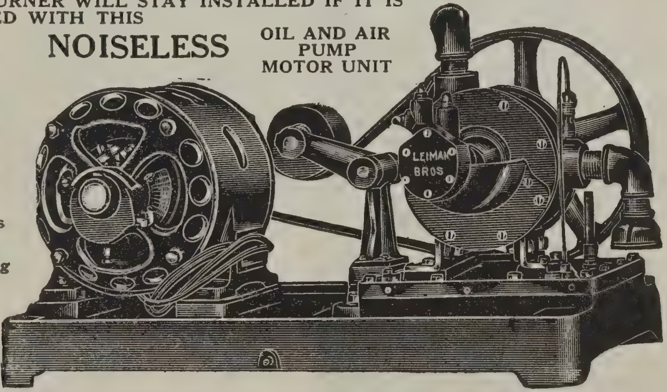

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pump. The pipe is provided with an outlet near the pump through which the flue gas is drawn into standard gas bottles by means of a water syphon for Orsat analysis. A Pitot tube is sealed in the approved manner into the flue near the smokehood so that average velocities are measured and the tube is connected to a draft gauge to indicate draft pressures. To more accurately determine actual fine conditions the stack dimensions are carefully determined. The density of the flue gas with reference to smoke formations is carefully observed as it passes the various flue openings. Provision is made to induce draft when the volume and temperature generated by the small burner are not sufficient to induce the draft required for a particular study.

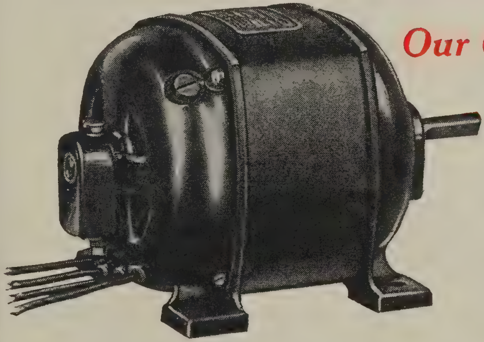
During each test the weather conditions with reference to velocity and direction of wind, humidity, barometric pressure and temperature are very carefully observed and recorded. No provision is made for the analysis of fuels used except for Baumé determinations and visual inspection. Unless there is some doubt as to the grade of fuel supply, the general analysis supplied by the oil company together with the B.T.U. analysis is accepted and used in the calculations.

Publish Insulation Folder

A folder showing the percentage of heat radiation loss saved by boiler insulation has been issued by the Celite Products Company, New York City, manufacturers of Sil-O-Cel boiler insulation.

Leland Motors

have all the good qualities which a motor used successfully with oil burners must have, such as quiet operation; non-stalling characteristics; minimum current consumption, which results in low operation costs; ability to function on low voltage or under other unfavorable conditions; a temperature rise of only 30° Centigrade; and a method of lubrication that requires a minimum of oiling.



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350 Madison Ave., New York City

COMPENSATING EFFECT OF ADJUSTABLE BOILER CONTROLS

(Continued from page 14)

without saying that in the fitting of an oil burner ino its place some measure should be taken to arrive at the proper temperature at which the boiler control should shut down the fire. A house which is of scanty radiation must, of course, require higher temperature of the heating medium than one amply radiated. Such peculiarities can be noted at the time of the preliminary survey, and specifications for the proper setting of the boiler controls laid down at the time. The data necessary for such intelligent provisions should, we think, form part of the engineering information of the operating companies. Adjustment of boiler controls is the finishing touch to the perfect installation of the present day automatic oil burner.

Burners Cut Operating Costs On Leviathan

Only 30 firemen are now required in the boiler room of the giant Shipping Board steamship Leviathan, which was converted from coal burning to oil burning last year. Before the conversion, 280 firemen and coal passers were necessary to keep the fires going. Conversion to oil also added 6½ knots to the Leviathan's speed, her old average, burning coal, being about 18 knots per hour.

"Coil" Water Tube Steel Heating Boilers are described in a new booklet recently issued by the Monitor Boiler Company, Philadelphia, Pa.

FUEL OIL
FOR HEAT and POWER

Devoted to developing and encouraging the efficient, scientific use of oil fuels.
Published Monthly

Vol. 3 January, 1925 No. 7

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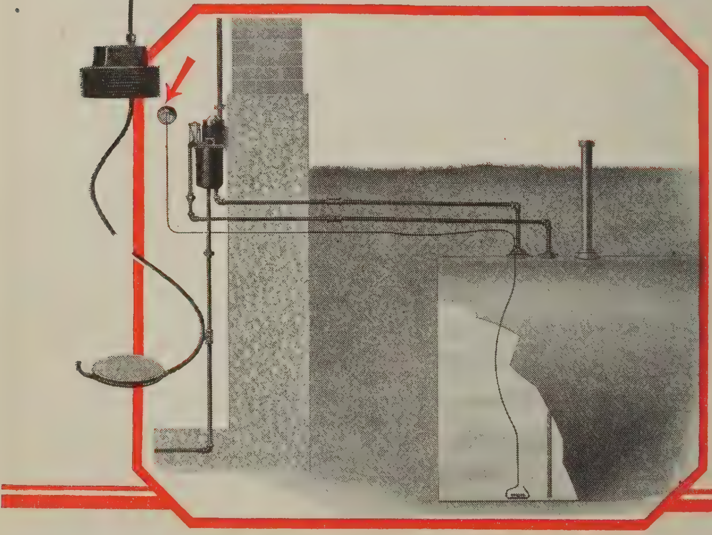

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Vol. III. Printed at New York No. 7

Burning Oil Efficiently in the Scotch Boiler

Success Depends On Burner Rings and Proper Adjustment

By C. H. Jack

WATER tube boilers, since the war, have been used in the merchant service as well as in the United States Navy. The Shipping Board uses several classes of water tube boilers, including the Babcock & Wilcox, Foster, Heine, and the Yarrow Boiler (sometimes called express type, which is installed in some of the larger passenger ships such as the "Leviathan" and "Majestic."

The Scotch boiler, although used for land installations, is also a sea going type, and is one of the older types used for the generation of steam. There are many operating engineers who hold that the Scotch boiler falls far below the water tube boiler in efficiency. There are, no doubt, many advantages in favor of the water tube type, but before we discard the Scotch boiler let us see just what has been done with it.

There are two main types of fuel oil burners used in the generation of steam for power plants. Both types, namely, steam and mechanical atomizers, are used in all classes of boilers at sea and on ashore. The flat flame steam burner is generally used in shore plants or on boats where the run is short. This is because the steam used for atomization goes up the stack a complete loss. The amount of steam used in the average steam burner is 2 per cent under efficient operating conditions. Because of this loss of fresh water, deep sea vessls cannot afford to use the flat flame steam atomizer type even though the boiler capacity be ample to keep the rating near the builder's 100 per cent rated capacity. The flat flame steam atomizer finds its most efficient point between 80 and 120 per cent of builder's rating, after which the efficiency drops off quite rapidly due to the methods of mixing the incoming air with the atomized oil for combustion. It can very readily be seen that the flat flame steam atomizer works out to a limited degree of satisfaction where higher ratings are required and the supply of fresh water is a problem.

The mechanical burner which atomizes the oil by pressure, is used on all deep sea vessels burning oil and in a good many plants on shore. This type is very satisfactory, for it uses no steam for atomizing and the steam used for driving the pumps is returned to the hotwell with very little loss. The efficiency does not drop-off as quickly at the higher ratings as that of the steam burner. This burner finds its most efficient boiler rating about 130 per cent of builder's rating, which is about 84 per cent boiler efficient, and drops off to about 78 per cent at 250 per cent of rating. This is true of most types of boilers equipped with the better types of burners.

OWING to the large size of the shell, Scotch boilers are ordinarily made of very thick steel and consequently lack flexibility. They are, therefore, liable to give trouble due to expansion strains from changes in temperature and are entirely successful only where the load is absolutely steady, as it is on a merchant ship whose speed is constant. Obviously, also, there can be no variance in the operation of the burner if success with this type of boiler is desired.

With this type of oil burner the quantity of oil burned is spoken of as oil burned per burner per hour. Under actual test conditions of a Scotch boiler with a burner capacity of 383 pounds the efficiency was 78.8 per cent. With the boiler and superheater of the waste heat type combined, the efficiency showed to be 81.83 per cent. With a burner capacity of 383 pounds the boiler rating in this particular case was 160 per cent. Thes results were made under test conditions, but there is no reason why the boiler efficiency under operating condition should not be within a very close margin to test figures. At the particular rating mentioned, the pounds of oil per square foot of heating surface was .38 pounds. This is slightly above the amount generally required for steamship purposes, although in some cases higher rates are required. It is not advisable, under operating conditions, to burn over .6 pounds of oil per square foot of heating surface, for the results would be detrimental to the boiler.

In order to expect high Scotch boiler efficiency the burner equipment should be designed for the particular conditions. For instance, if the working capacity of the burner is to be within a range of 250 to 350 pounds, the equipment should be installed to suit. The throat or ring where the flame goes through, getting the mixture of air, should be of proper size. These throat rings are sometimes called combustion rings or venturi rings.

If the combustion ring is too large, the oil and air do not get mixed

(Continued on page 76)

Steam Is Best Medium for Preheating Fuel Oil

Method of Using It, However, Depends on Local Conditions

By Keith J. Fanshier

HEATING of fuel oil prior to atomization, or "pre-heating," has been regarded for a number of years as a feature of the best practice in industrial oil burning and in many cases has proved absolutely necessary. Many plants using oil as fuel, however, lack information as to the best means of bringing oil to a temperature where its atomization and combustion will be most efficient. This is evident from inquiries made to burner manufacturers and oil companies.

Heavy Oil Chokes Pumps

Fuel oils, especially those with asphaltum base or low Baume readings, naturally are quite viscous at low temperature and often give trouble, due to their tendency to solidify with consequent choking of fuel oil pumps and pipes. This condition manifests itself first in installations where the service tank is below the fuel pump level, as congestion naturally interferes with the suction efficiency of the fuel pump.

To counteract this, several preheating systems have been devised to insure that the oil at all times flows freely and keeps the fuel pump flooded. Generally speaking, each system depends for its ultimate economy on conditions prevailing at particular locations and there are conditions under which it has appeared advisable to install a combination of two systems.

Variables Determine Temperatures

The temperature to which it is best to pre-heat fuel oil depends upon several variables, including the specific gravity and viscosity of the oil and to some extent upon the burner employed. The flash point of the fuel also is important in preheating because of the factor of safety always to be remembered. Where the oil has a fairly high flash point, a low gravity fuel may be heated for best results to comparatively high temperatures; but this will not be necessary if the oil is a high gravity oil, other things being equal. Relatively speaking, fuel oil is a difficult substance to heat, because of its chemical composition. As a rule, where flash point specifications do not interfere, a 30 degree Baume gravity oil would atomize efficiently in a mechanical type burner preheated to 135 or 140 degrees Fahrenheit, whereas a 15 degree gravity oil for the same result probably would have to be raised to about twice that temperature, say 275 or 280 degrees.

While it is not the only method, steam may be said to be far in the lead as a medium for pre-heating fuel oil. In the majority of plants

(Continued on page 72)

Distributors Issue Folders on the Berkin Burner

"King Coal Dethroned" is the title of a folder that has been issued by the Liberty Heat Equipment Company, St. Louis, distributors of the Berkins Oil Burner. The Berkins is a natural draft burner, the combustion plate of which is placed on the grates of the furnace in which it is installed. The oil is delivered to the plate through small nipples and orifices in its upper surface, and a goose-neck pipe conducts the air for combustion from beneath the burner and discharges it directly down upon the plate.

Chicago Oil Dealers and Manufacturers Organize

An organization known as the Chicago Oil Burner Association was formed at the Hotel Morrison, Chicago, December 16, when a number of burner manufacturers and dealers interested in the common problems of the industry met for the purpose. Membership in the association will be open to burner manufacturers and distributors.

Officers of the new association elected were: President, S. O. Andros, Editor *The Home Comfortable;* secretary-treasurer, T. C. Kyle, Winslow Boiler & Engineering Company; first vice-president, Charles H. Crooks, Aladdin Oil Burner Company; second vice-president, Linn T. Piper, the Oil Heating Company; third vice-president, H. N. Rosenheim, A. B. C. Oil Burner Company.

Regular meetings of the association are planned, as is action to increase membership. The purposes of the organization are to promote the interest of efficient oil burning and help solve the common problems of manufacturers and dealers. It was estimated at the meeting that 25,000 domestic oil burners now are installed in Chicago, burning about 75 million gallons of oil a year.

Electrical CO_2 Measuring Is Described

How to measure carbon dioxide in flue gas electrically is told in a catalog sent out by the Brown Instrument Company, Philadelphia, Pa. Besides showing the Brown electric CO_2 recorder, it contains some excellent advice on economy in power plants through efficient generation of steam obtained by correct air supply and heat absorption. Graphs, tabulated data and photographs are used to illustrate the use of the electric combined CO_2 and flue gas temperature recorder.

Most Vessels Through Panama Canal Burn Oil

Of vessels passing through the Panama Canal during the fiscal year, 66 per cent burned oil, 28.4 per cent burned coal and 4.8 per cent were motor vessels. In totals, 5,230 ships passed through the canal, of which 3,452 burned oil, 1,487 coal, 255 were motor vessels and 36 were sailing vessels, tugs, etc. Vessels burning either oil or coal or both were classed as oil burners.

The Permutit Company, New York City, manufacturers of water softeners, have issued a booklet entitled, "Reducing Fuel and Boiler Plant Operating Costs."

Some Elementary Ethics for the Industry

By Arthur G. Winkler

THERE are two schools of thought in the oil burner business. The policies of everyone in the business conform more or less to one or the other of these schools. One is constructive, building for the future, striving for enlarged service to the public. The other is destructive, unthinking and sees only momentary profit.

Here are two illustrative incidents, unconnected but telling their own stories. First an example of the destructive type.

A home owner entered the salesroom of a well known burner company, stating that he was comparing burners and asking to be shown the merits of this particular one. Of the thirty-five minutes he spent there, twenty-five were given over wholly to a dissertation by the salesman, who was of the so-called "high-powered" persuasion, on the shortcomings of competitive burners. Failure of this burner, improper performance of that one, damaging evidence concerning another, false claims of still another—chang! clang! clang! went the hammers of this energetic knocker on the consciousness of the prospect. When the prospect finally wilted under the flow of words and backed out, his face bore evidence that he had been "un-sold" on many burners, including even the one the salesman represented, and, worse, that his faith in the whole idea of oil burning had been shaken.

AN oil engineering class of twenty-five students from a large university assembled recently to watch a demonstration by a domestic burner distributor. Unfortunately, he prefaced his demonstration by saying: "There was a big burner explosion at . . . . last night, but it was caused by a Blank burner, not by one of ours, etc." It has since developed that the explosion was not "big" and that the circumstances were most unusual, the burner being little to blame. But the class didn't know that, so oil burning was in danger of losing twenty-five friends.

Who understands this man's attitude?

Now here's another incident, one which augurs well for the industry of the future. The writer recently read a proposed ordinance covering oil burning in residences in a small city near Chicago. According to the mayor of the city, the ordinance was prepared by an officer of a company manufacturing burners whose name is, incidentally, known to the entire industry. Included in the ordinance was the provision that the burners permitted to be installed should meet certain well-known standards of approval, or that they be devices approved by the public welfare and safety authorities of the municipality. There was no reference to make, brand or trade-mark; no specifying of style or type of burner in which the author of the ordinance naturally was most interested, no specific ban on burner makes or features which the writer happens to know run counter to the ideas of that company. It was a clear, thorough-going statement, acknowledging in few words a whole world of tolerance and respect for the other fellow, based on the realization of what the whole industry must come to know—that as an industry it will thrive and prosper only as its members forget their insignificant jealousies and concentrate upon the goal of service. The mayor said the burner man had spent many hours going over with him the needs of the community and the provisions of the measure.

Ranks of Boosters Growing

This burner man had given freely of his time and energy to accomplish something from which he and his concern would profit only as their competitors benefited. His is one of the growing number of companies which will not countenance any approach to knocking of competitors on the part of its organization.

If the industry is to grow and prosper in keeping with its opportunities, its members, both personal and corporate, must exhibit more of that sort of vision and broad-mindedness and less petty short-sightedness.

New England Oil Heating Association Meets

Burner manufacturers, plumbers and customers numbering nearly 250 attended a dinner given by the New England Oil Heating Association in Boston on December 12th. This association is making strenuous efforts to interest the plumbing and heating trade in the distribution of domestic burners and about 40 plumbing and heating firms were represented at the meeting at which a good program of speeches on oil burning was presented.

Speakers included W. B. Smith-Whaley, Jr., of the Aetna Oil Burner Company, and president of the association; L. E. Johnson, treasurer of the association and president of the Economy Heater Company; M. R. Blakeley, of the Johns-Manville Company; G. Balcom, of the Stack Heater Company, Boston; Chief Donahoe, of the Boston Fire Department; E. A. Whitney, of the Westinghouse Company; and Harry Collins Spillman, who spoke on cooperation and the fine points of selling.

C. B. Bendict, of the Vulcan Oil Burner Company, secretary of the association, read a report which stated that the Underwriters are seeking to cooperate with the association.

Keeler boilers, stacks and breechings are pictured in a brochure that has been mailed out by the E. Keeler Company, Williamsport, Pa.

Completing the Survey For Oil Burner Installation

Computations Attending Survey of Hot Air Burner Are Many If Survey Is Complete

By George W. Graves

WE have been considering the capacities of and taxes upon the steam and hot water heating plants. Let us now consider the hot air systems.

The standard of heating in a warm air system is the quantity and size of heating pipes the furnace will supply with air warmed to the required temperature. To find the required pipe area for any particular room, the pipes must contain as much capacity in square inches as there are square feet of glass surface plus five per cent of outside wall surface plus one per cent of the cubical contents of the room.

IN this article Mr. Graves covers the preliminary work up to the actual installation of the oil burner. This was dealt with in previous articles. This series emphasizes throughout the importance of care and accuracy in the work preliminary to getting an oil burner in efficient operation.

For example—we have a room ten feet wide, twelve feet long and nine feet high, two sides exposed and having three windows each two feet, six inches wide and six feet high. The glass surface is seen to equal forty-five square feet. The exposed wall surface, 10 times 9, plus 12 times 9, is 198 square feet, and subtracting the glass surface leaves 153 square feet. The cubical content of the room is 1,080 square feet. One square inch for each square foot of glass equals forty-five square inches. Five per cent of exposed wall surface gives eight square feet. One per cent of the cubical content equals ten cubic feet, giving a total of the three f sixty-three square inches. Therefore, the size of the pipe in this room must have an area containing sixty-three square inches, and by use of the proper method we find this is contained in a round pipe nine inches in diameter.

This rule applies to first floor rooms only and for the second story rooms fifteen per cent should be taken from pipe capacity. For extra long runs of piping, a pipe one inch larger in diameter than under this rule should be used. To determine whether or not the furnace installed is sufficient to heat the premises, use the rule suggested above for each room and the sum of the pipes will determine the size of the furnace required. This data is contained in all standard heating engineers' handbooks.

The principal value of this rule is to check up the hot air pipes and furnace in a hot air system already installed to see if there is sufficient capacity in the pipes and furnace. It is well to remember that in good practice the total area of cold air ducts should equal the total area of the combined hot air pipes. If the system is found from the engineer's survey to be acceptable for the burner, the size of the burner to be used should be determined by ascertaining the amount of steam radiation required to heat the premises properly in the manner described previously for steam radiation, using the result as total tax, including, of course, the proper increased amount for piping installed.

Should Show Defects

Under remarks, on the engineer's inspection sheet, information should always be shown regarding any existing minor defects in the heating plant, such as cracks or joints in hot air furnaces which need cementing, badly-fitting clean-out or fire doors on boilers which should be sealed or repaired, steam and vapor boilers which should be thoroughly blown out or any other special work which should be attended to either before installing or at the time installation is actually made.

After completing the engineer's inspection sheet, the inspector should make the layout sheet. This should be made in duplicate, one copy to remain in the folder for the office records and the other to be sent with the burner to the job for the use of the installation crew when installation is made. The tank and thermostat locations should be approved by some member of the family with authority to decide these questions, having them O.K. the locations on the layout sheets if possible to avoid any dissatisfaction or the necessity of changing either or both these units after work is completed.

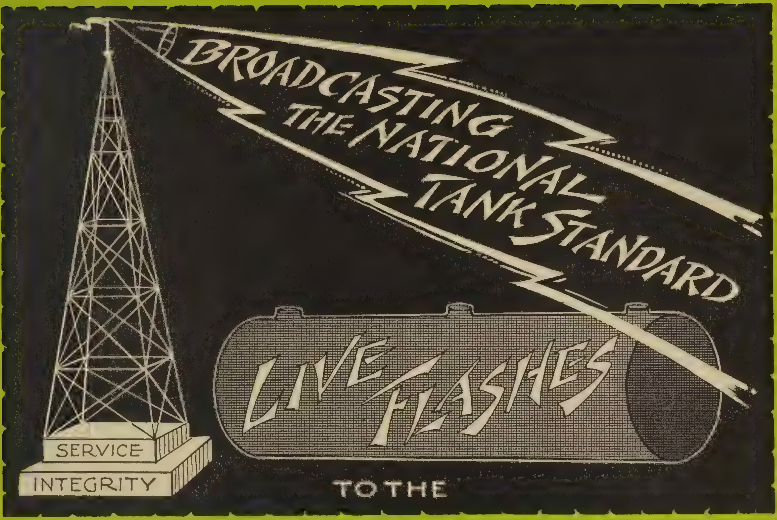
The inspector should pay particular attention to the thermostat location, not only taking into consideration the proper functioning of the instrument relative to its location near outside walls or on walls through which piping is run, but ascertain that no steel beams and heavy timbers in the premises will interfere with proper installation of the thermostat wired to the desired location.

Must Observe Ordinances

Service tank locations should be far enough away from the boiler to comply with local ordinances of the fire prevention bureau as well as the insurance or Underwriters' requirements. Consideration must also be given to the necessity for connection to an outside fill as well as ventilating pipes and supply pipes from the underground tanks. At the same time there is the problem of the best practical method of running the fuel line from the service tank to the burner and installation of a pump connecting the outside storage to the inside service tank in a suitable location. The capacity and method of connecting the reserve supply tanks will vary with local ordinances.

Measurements of basement doors, area-ways or right angle stairs to the basement must be considered before making tank locations. Where 200-gallon or over tanks cannot be

(Continued on page 50)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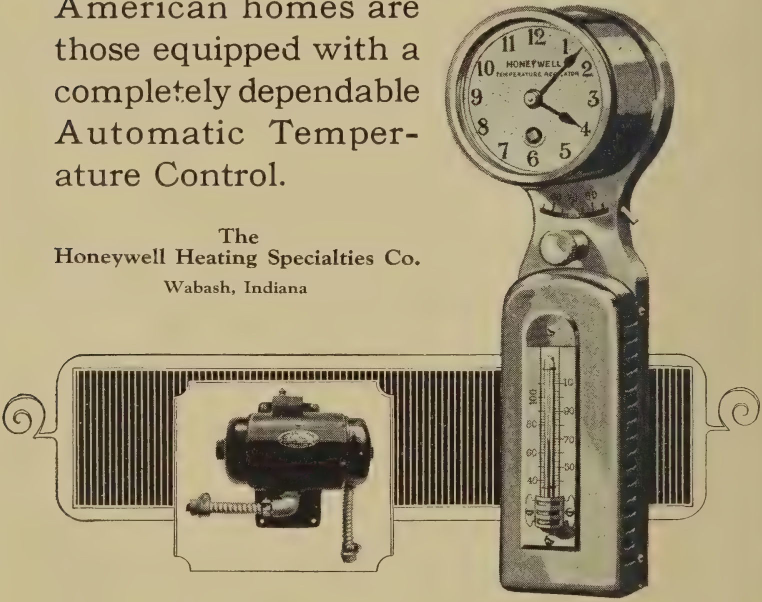

HONEYWELL
Temperature Regulators

Oil Burning Research

By A. S. Meikle

Part III

IN making capacity and economy runs, the committee of the American Society of Mechanical Engineers on boiler tests make certain recommendations in the code to be followed in conducting such tests. Two methods in general are adopted: one, the Standard Method, which provides for drawing the fires after the boiler has been brought up to operating conditions and building new fire with weighed fuels; the other, known as the Alternative Method, permits the beginning of a test without drawing the fire. Fire box conditions are carefully observed so that they may be maintained the same at the end of the run as at the beginning. Weighed fuels are merely added.

Alternate Method Used

The method adopted for securing the test data which appear in this paper is analogous to the Alternate Method referred to above. The oil burner is operated in the test furnace for several hours until all conditions are static. At this point the feed line is filled with oil from the unknown supply. At the moment testing begins the feed is switched to the known supply. The weight of oil in the pipe from the unknown supply to the burner at the beginning of the run is of course exactly the same as the weight of the oil in the pipe from the known supply at the end of the run and therefore no errors in weight are introduced.

The time at which the weighed supply of oil begins to feed into the burner is recorded and the run continues until the weighed supply is depleted. The readings of all instruments are recorded at frequent corresponding intervals during the run so that averages may be obtained. Shortly after the measured run begins the flue gas pump is started and at the end of about 15 minutes, or after it is certain that the flue gas coming off is representative of that in the smokehood, the first flue gas sample is collected. Near the end of the run a second flue gas sample is secured, the gas being drawn off continuously throughout the run. Extreme care is exercised to secure exact water levels in the calibrated tank at the beginning and at the end of the run; for, at the end of the measured run, the oil supply is switched to the unknown supply and operation continues. Throughout the measured run the characteristics of the flame and the smoke densities are observed frequently in the data recorded.

Slice of Day's Run

In reality, a period of time is actually sliced out of the day's run, during which period the amount of oil-fuel consumed and the weight of water evaporated together with all other pertinent data are collected and recorded. These data are assumed to be representative of the conditions one might expect to find if one should operate the boiler continually for a longer period during which similar data might be collected. In order that the results may be representative, the run must be at least one hour in duration, preferably two hours or more.

At the end of the day's run, a very thorough examination is made of the burner, the combustion chamber and flue ducts to determine their condition. Carbon deposits are carefully studied with reference to location, quantity and character. All parts are thoroughly cleaned of carbon deposits, ready for the next day's run.

Ninety-three Runs Made

During a recent 90 day period of continuous testing ninety-three runs were made to determine in general the characteristics of the natural draft gravity feed burner. Many observations were made and a careful analysis of the data obtained from these runs brought forth fundamental facts concerning many of which there seems to be little previous conception or at least these conceptions have not reached print.

It is evident that during the operation of the boiler a certain amount of heat is transmitted to the room from the boiler surface. In order to determine the total amount of useful heat generated by the burner operating under a particular condition, this transmitted heat must be considered. In a great many tests made by the American Radiator Company, steam was actually passed through the boiler under two pounds pressure and the steam condensed by the boiler was weighed. It was found that for uncovered cast iron boilers of all types, 2.8 B. t. u.'s per hour per square foot of external boiler surface per degree difference between room and steam temperatures is transmitted to the room from the boiler surface. Therefore 2.8 is used as the coefficient in the calculations in determining the amount of heat yielded by the oil consumed. For covered boilers this coefficient is 1.8. The coefficient of 1.9 is used as the factor in the case of the exhaust pipe, the area taken being that of the portion which drains back into the boiler.

The high carbon dioxide content of the flue gas collected during the above test run would indicate very high burning efficiency, especially since oil is the fuel burned. However, one is very easily mislead if this carbon dioxide content is alone considered in rating the domestic burner with reference to efficiency of operation. This applies equally to all types of domestic burners. There are few if any domestic burners in the market which, without fundamental modifications in the method of application to the furnace, can be operated continuously with this high carbon dioxide content without seriously imparing the overall efficiency of the installation.

The data of greatest general interest were collected during several series of runs made to show the effect of changing drafts with a constant fuel supply. Before conducting these tests several lengthy investigations of actual burner installations were made where variations in draft could be studied together with the effect upon the composition and temperatures of the flue gas as well as on the general heating conditions.

The following is a typical worksheet showing how the data are recorded and briefly shows how the calculations were made:

These observations were conducted over a period of several weeks during which very erratic variations of the draft pressures and other attendant conditions were repeatedly observed. This series of tests was designed so that these wide variations might be studied under controlled conditions. The series was checked and rechecked. The results of the test which more

Condensed Data Sheet

Object of Run

To determine capacity of a standard furnace burner installed in a test furnace equipped with a 24 inch fire brick combustion chamber and also the overall efficiency of the heating unit.

After careful inspection of furnace and flues the fire was started at 8:15 a. m. and the furnace brought to static condition when the following data was recorded.

Recorded Data

	Temperature					
Time	Room	Water	Steam	Chamber	Stack	Draft
1:45	76	55	212	960	400	.15
2:00	76	55	212	1000	395	.145
2:15	76	55	212	1000	400	.15
2:30	76	57	212	1000	395	.15
2:45	76	56	212	1000	395	.15
3:00	77	56.8	212	1010	400	.145
3:15	77	57	212	1010	395	.145
3:26	77	58	212	1020	385	.140

Water tank readings: At start—6⅝ inches; At finish 27 15/16 inches.
Fuel oil consumed: 20 Pound of 40° Baume, 19,825 B.t.u. oil.
Flue gas analysis: carbon dioxide, 11.6 per cent; oxygen, 5.4 per cent; Carbon Monoxide, 0.0 per cent.
Atmospheric conditions: Outside temperature, 70° F; weather fair and clear, no perceptible wind.

Calculated Data

Duration of run: 1.683 hours.
Water Evaporated: 243.81 pounds or 144.87 pounds per hour.
Oil consumption: Pounds per hour, 11.88 pounds; Gallons per hour 1.72 gallons.
Useful heat delivered during run, to raise water 212° F... 37,985.60 B.t.u.
To convert water at 212° F to steam at 212° F............236,495.70 B.t.u.
Heat radiated from uncovered boiler...................... 28,788.82 B.t.u.
Heat radiated from uncovered exhaust.................. 1,039.92 B.t.u.
Total heat delivered........................ 304,310.04 B.t.u.

Equivalent evaporation—pounds of water, from and at 212° F............ 313.72 pounds
Evaporative Power—pounds of water evaporated per pound of oil....... 15.68 pounds
Overall Efficiency.. 76.75 per cent
Hot Water Rating—actual square feet rating developed during run, assuming the boiler to be covered.. 1134.6 Sq. Ft.
Combustion Density—pounds of oil burned per cubic foot of combustion volume per hour.. 1.8 lbs.

Comments

The flame burned with slight smoke formations. Examination of the furnace flues indicated that this slight formation was carried out of stack.

In a previous run it was possible to get a carbon dioxide content of the flue gas of 13.4 per cent. In still another run it was possible to secure a combustion density of 2.98 pounds of oil per cubic feet of combustion volume per hour.

nearly apply to actual average conditions are condensed in the plot shown in Figure I and represent accurately what may be expected in any installations where there is variation in volume of air supplied to a given volume of burned fuel.

To secure the data from which the curves were drawn, after starting the fire in the furnace, the check damper in the flue was opened as wide as possible to short-circuit the draft, thereby reducing the volume of air drawn thru the burner to a minimum. At this minimum

(Continued on page 54)

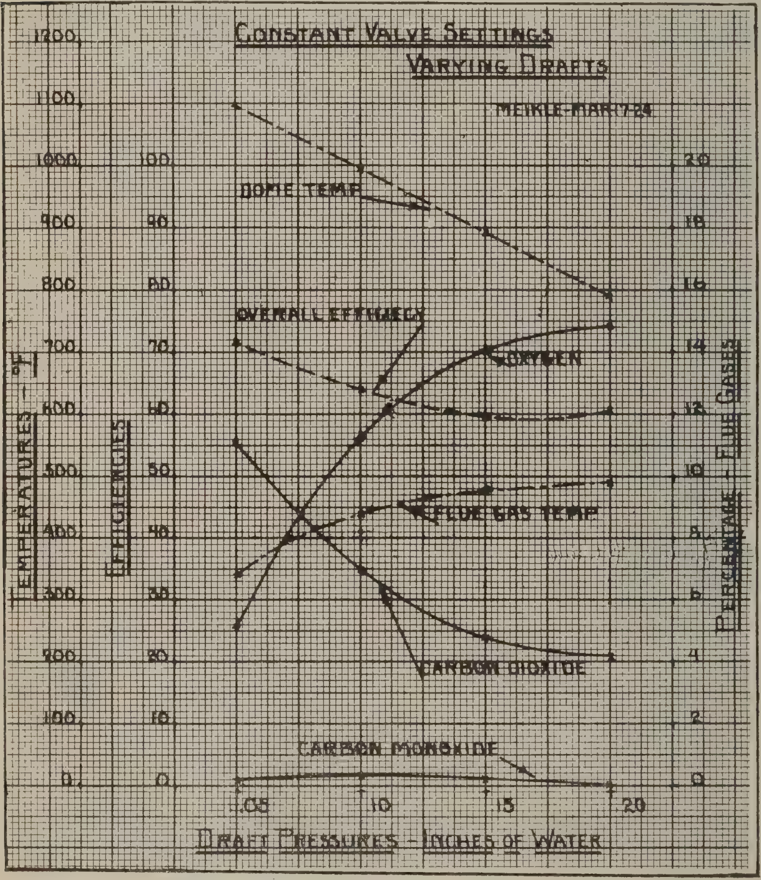

Figure I.

Fundamental Facts Concerning The Petroleum Industry

By Henry L. Doherty*

NO other man in the oil business is making the intelligent effort to rouse the industry's interest in fuel oil and make it realize the importance of the oil burner than is Mr. Doherty. The accompanying excerpt from his recent address to a group of oil jobbers contains sound, logical advice gained and proved during his experiences in the electric light and gas industries, where his interests are even larger than in the oil industry.

SEVERAL months ago, an officer of one of our large artificial gas companies told me that they were trying to sell gas for burning common building brick and they thought they could demonstrate to the owners of this brick manufacturing company that they could save enough on over-burned and under-burned brick and by other economies to pay the cost for gas over the cost for coal. They did succeed in getting this business and the brick manufacturer is entirely satisfied in spite of the fact that he is paying for this gas, the equivalent of 21c a gallon for fuel oil. Here you have a case where business cannot be secured for oil even if sold for half the cost of a competitive fuel. When I think of all of the suspicion directed towards us, a whole parade of investigations and questionnaires, a widespread resistence against the use of fuel oil, I can only conclude there must be something wrong with us. When my associates in the oil industry tell me that a situation like this is all right and we ought to be satisfied with it I can neither believe it is right nor can I be satisfied with it, even if these men have had more experience in the oil business than I have had.

To my mind, our business is basically wrong and it can never be made right until we can provide a dependable supply of oil. To do this we must change the laws under which we work and make these laws the same as pertain to all other classes of property.

The only other property of product from property which is under laws similar to the laws governing the production of oil, is wild birds and wild animals and what has happened to them is rapidly happening to our oil.

When I say "I," and when I say "in my opinion," I do not mean to evidence the slightest conceit, but rather mean to let you men understand that I am not assuming that I can bring you any other authority for my views except my own statements, but I believe if time would permit, that I could make these statements so obvious to anyone that they would be convincing without need for corroboration.

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*From an address before the recent convention of the National Petroleum Marketers Association.

No Production Laws

When petroleum was first discovered it must be quite plain to every one that there could be no laws prescribing how it should be produced or how the ownership should be determined. It was believed in the early days by many to represent an underground flowing stream of oil. The Courts were forced to make the best decisions they could and that is the way our laws were made under which petroleum is produced, and while on the the face of it, it could be argued that it was intended that these laws should be made in conformity with the laws governing all other forms of property, nevertheless, in the last analysis, oil or gas belongs to the man who can capture it, and this means that we have absolutely no control over our production and that we are the only business that does not have any control over its production. Other mineral products are located and blocked out but are only removed from their ground reserves as the market requires them. The discovery of an oil pool results in a frenzied effort to exhaust this deposit as rapidly as is humanly possible and without regard to whether the market needs this oil or even whether the market can absorb it, and on the other hand, this means that we never have any real ground reserves of oil on which we can draw in case of need.

I will not dwell on the evils of this system, for to even state the plain facts in the most conservative and most sympathetic way seems to antagonize many of my associates in the business. Our present system leads, however, to vastly greater expenditures than are necessary. We fail to recover anything like the maximum oil from the sands. In many cases the gas pressure is quickly dissipated and large sums must be spent for pumping which would be almost entirely unnecessary if the gas were conserved. In some cases, more gas is wasted than the entire value of the oil recovered. No other industry is required to work its men under such favorable, inconvenient and unpleasant conditions. Some man starts a wild cat well. If he strikes oil there is an army of people there the next day seeking leases, starting drilling operations and covering all of the other activities of a new oil field, and yet no provision has been made for their care, comfort of health. The condition of most oil camps is both disgraceful and inhuman.

Rejected Before Heard

At one of the few well attended Board meetings we have ever succeeded in having, which was held at the Biltmore Hotel in 1923, my plan for correcting these conditions was practically rejected before it was heard. Our inability to control our production gives rise to 90 per cent of all the evils of which the industry and the public complain. We cannot change these conditions without changing our laws. I am not advocating more laws or a greater degree of government control, but simply the substitution of good laws for bad laws. Laws based on our present knowledge after more than sixty years of operation and not those based on the ignorance which prevailed when the business was new. It is, in my opinion, a small matter to change these laws and secure no greater degree of government interference than we have now.

I submitted such a plan to a committee of the American Petroleum Institute and a sub-committee signed the report recommending the plan, but there was so much objection to this plan that no one is now advocating it except myself. The most violent opposition came from men who did not then and do not now know what my plan is. An industry is in a bad way when it rejects things of this magnitude without a hearing.

Couldn't Convince Members

In the early summer of 1923, I endeavored to convince the members of the executive committee of the American Petroleum Institute that we could stimulate our markets to an extent that would absorb all of the oil that we were then producing and secure a billion dollars more per year for it. The figures that I presented were not a mere guess, but they were made up by me with the assistance of our industrial fuel organization which builds and sells industrial and domestic furnaces for the utilization of solid fuel, natural gas, artificial gas and industrial heating by means of electricity.

It was suggested by some of my associates on the executive committee that it would be desirable to make these figures public, and as I had been invited to address the convention of the American Petroleum Association at Atlantic City in September, I gave out these figures in a paper to that convention entitled "Keeping Sales Ahead of Production." Few people as yet seem to have taken these figures very seriously. At the meeting of the American Petroleum Institute in December of last year I tried—together with the members of the staff of the Institute—to show what was possible in certain branches of this work and particularly in the matter of house heating. We invited the makers of oil burning apparatus to meet with us. We held several sessions devoted to the utilization of oil and especially for house heating. I thought the sessions devoted to this work were very convincing, and at a meeting of the Board of Directors of the American Petroleum Institute immediately after the convention in St. Louis I endeavored to secure an appropriation for the work of the Utilization Committee of $100,000 per year.

Vote Against Expenditure

I was asked whether this work could not be carried on for $6,000 per year—this amount being suggested by the fact than one member of the staff was about to resign and he had been drawing $6,000. I stated to my associates that I did not think we would be warranted in starting on an appropriation of less than $100,000. I could not muster a single vote for an expen-

(Continued on page 62)

Underwriters Issue a New Approved Burner List

Eleven oil burners are on the testing floor of the Underwriters' Laboratories, Chicago, Ill., at all times undergoing examination for admittance to the Underwriters' approved list, according to G. T. Bunker, assistant secretary. Every conceivable condition that a burner would likely face is reproduced and the action of the burner under such conditions is noted.

The most recent approved burner list issued by the Laboratories appeared on December 10, 1924. The names of the burners which it contained and their manufacturers are as follows: "Arrow," Socony Burner Corp., New York, N. Y.; Baker "Model F," Baker Steam Motor Car and Mfg. Co., Inc., Pueblo, Colo.; Caloroil and Caloroil "Type A," Caloroil Burner Corp., New York, N. Y.; Electrol "Type S," Home Appliance Corp., St. Louis, Mo.; Hart "Type C," Hart Oil Burner Co., Peoria, Ill.; "Inter-State," Inter-State Oil Co., Sioux City, Ia.; Johnson "Type 22," S. T. Johnson Co., San Francisco, Cal.; Kleen Heet "Types G, GJ and E," Winslow Boiler and Engineering Co., Chicago, Ill.; Lillibridge "Types 38-D, 68-D, 99-D, and 9-11D," Lillibridge Heating Corp., Hutchinson, Kan.; Nokol, American Nokol Co., Chicago, Ill.; Oil-O-Matic "Types D, E and F," C. U. Williams & Son Co., Bloomington, Ill.; Oliver "No. 30A," Oliver Oil-Gas Burner Co., Inc., St. Louis, Mo.; Quinn, Quinn Oil Burner Corp., Port Richmond, Staten Island, N. Y.; Rotary "Type B," Rotary Mfg. Co., Los Angeles, California.

All those given above are classified under the heading of "Domestic" by the Underwriters and only one—Ballard "Type H," Ballard Oil Equipment Co., Inc., New York, N. Y.—is listed under the "Industrial" head.

Announce New Boiler

Walsh & Weidner Boiler Company, Chattanooga, Tenn., has announced a new forged steel sectional header boiler. The headers, the announcement states, are seamless forgings, made of open hearth steel, and meet the revised A. S. M. E. code requirements.

Average Price of Fuel Oil in the United States — by Months, 1913-1923

Average for All Fields

(In dollars per barrel)

Calculated by Joseph E. Pogue

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924
January	1.08	1.05	.712	1.05	1.32	1.91	1.88	2.33	1.92	1.21	1.26	1.32
February	1.06	1.06	.700	1.07	1.38	1.90	1.60	2.33	1.44	1.20	1.34	1.53
March	1.06	1.04	.653	1.09	1.39	1.90	1.55	2.88	1.39	1.17	1.36	1.46
April	1.12	.992	.656	1.04	1.39	1.99	1.44	2.93	1.39	1.24	1.32	1.35
May	1.11	.968	.657	.941	1.42	2.09	1.40	3.24	1.23	1.26	1.22	1.29
June	1.07	.963	.658	.962	1.47	2.11	1.37	3.18	1.08	1.32	1.17	1.25
July	1.06	.874	.677	.965	1.67	2.11	1.37	3.12	1.02	1.29	1.13	1.24
August	1.09	.853	.690	.968	1.67	2.05	1.40	3.11	1.03	1.27	1.14	1.22
September ...	1.03	.780	.699	1.01	1.67	2.07	1.44	3.02	1.04	1.30	1.14	1.30
October	1.02	.756	.745	1.04	1.76	2.06	1.49	2.74	1.32	1.26	1.13	1.33
November	1.05	.748	.881	1.16	1.77	1.97	1.62	2.44	1.46	1.21	1.09	1.36
December	1.02	.745	.909	1.18	1.86	1.96	2.52	2.13	1.26	1.18	1.09	

Stopping Heat Waste by High Temperature Insulation*

In Furnaces Whose Temperatures Are Above That of Steam

AS a result of a survey of data regarding the percentage of heat lost in industry in the United States, it is estimated that our waste of industrial heat approximates one billion dollars a year. The advent of the heat balance sheet in industrial operations has clearly brought out the large proportion of the heat generated which is lost by conduction through and radiation from the walls and other exposed surfaces of various types of equipment. The data in Table 1 have been compiled from a number of authorities in their respective lines and illustrate typical heat balances of heated equipment, uninsulated except as otherwise stated. It will be noted that the heat losses due to conduction and radiation average over 25 per cent of the total available heat in the fuel.

Heat Is Molecular Vibration

Heat is a form of energy consisting of molecular vibrations of periodic character and subject to the general laws of wave motion, and can be reflected, dispersed or retarded by suitable mechanical means. Heat is transmitted from one place to another by three methods—radiation, convection and conduction; the definitions of which are well known and need not be gone into.

It should be clear at the outset that heat tends to flow from a region of high temperature to one of low temperature and thus becomes unavailable for use, just as electricity at high potential dissipates itself unless suitable insulation is used. In the loss of heat from a furnace wall there is involved, first, the transmission through the wall to the outer surface; and second, the giving out of that heat from this outer surface to the air, which carries it away. No more heat can be transmitted through the wall, at equilibrium, than is emitted by the outer surface of that wall.

Considering the variables separately, the quantity of heat transmitted through a wall varies directly with the area of the wall, the temperature difference between the hot and cold surfaces of the wall, the thermal conductivity of the material of which the wall is composed, and inversely with the thickness of the wall.

The rate of emission of heat from the cooler face of the wall depends upon various factors—mainly, upon the surface temperature, the temperature difference between the wall and the adjacent air, the rate of circulation of air, and in lesser degree, upon the nature of the surface of the wall, its color, degree of smoothness, and material of construction.

Radiation losses rise rapidly with

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* Compiled by Celite Products Company Chicago, Illinois.

rise in temperature and it is consequently increasingly important to reduce heat losses at the higher temperatures. The increase of radiation loss with increase in temperature is very clearly shown on a curve prepared by C. R. Darling giving heat losses from metal surfaces at various temperatures (Figure 1). For instance the steel casing of a furnace at 180° F. will radiate 240 B.t.u. per square foot per hour while at 360° F., the loss will be 1,000 B.t.u. per square foot per hour.

While transfer of heat by conduction applies to the three states of matter, it is of importance only in dealing with solids. Since conductivity is responsible for the greater portion of the heat transmitted through a wall, it is in this form of heat transmission that we are particularly interested. The formula for heat flow by conduction follows:

$$H = \frac{c}{d}(T_1 - T_2)$$

Where H is the quantity of heat conducted per unit area per unit of time.

c is the thermal conductivity of the conductor at the mean temperature.

d is the distance between the limiting surfaces of the conductor.

T_1 is the temperature of the hotter part.

T_2 is the temperature of the colder part.

For some time there was a general belief that since air is a poor conductor of heat, air spaces built into the walls of boilers, furnaces, etc., would prevent or reduce heat loss through the walls. Messrs. Ray and Kreisinger of the U. S. Bureau of Mines ran a series of exhaustive tests on air spaces used as an insulation and showed that this artifice defeats its own purpose at high temperatures because of the fact that the hot surfaces of the air space radiate heat so rapidly that a greater amount is lost across the space by radiation than would be conducted were the air space to be

TABLE NO. 1

Heat Balances of Typical High Temperature Equipment

Type of Equipment	Heat lost in Radiation	Heat lost in Flue gases	Heat carried out in product	Heat absorbed in product	Other losses
Rectangular Ceramic Up-draft Kiln...	71.1%	18.6%	6.7%		4.58%
Open Hearth Furnace................	60.8%	13.6%	15.9%		9.1%
Down Draft Kiln 26′..................	54.9%	29.9%	......	11.3%	3.9%
Down Draft Kiln. 28′..................	49.51%	27.33%	......	19.55%	3.51%
Reverberatory Furnace...............	47.0%	40.0%	7.0%	6.0%	......
Continuous Tunnel Kiln...............	45.0%	35.83%	17.27%		3.27%
Reverberatory Furnace...............	39.5%	45.7%	0.5%	3.6%	10.7%
Down Draft Kiln. 30′ (Producer Gas-Fired)...............	34.9%	28.8%	20.6%	2.2%	13.5%
Lead Roaster..........................	25%	22%	23%	22%	8%
Rotary Cement Kiln..................	20%	35%	20%	25%	......
Lime Kiln..............................	17%	22%	11%	39%	12%
Continuous Kiln (Chamber Type).....	13.4%	33.7%	......	22.3%	30.6%
*Dayton Oil Gas Generators.........	10.79%	......	89.72%		......
*Hofman Kiln. (Insulated)............	6.9%	6.9%	......	23.9%	63.4%
*Dressler Kiln. (Insulated)...........	5.4%	8.3%	9.1%	49.6%	27.6%
*Heine Boiler (Maximum)............	22.36%	13.37%	55.87%		8.40%
*Heine Boiler (Minimum)............	3.14%	17.24%	73.64%		4.98%
*Babcock & Wilcox Boiler............	4.2%	9.2%	79.8%		6.80%

* Equipment partially insulated.

filled with material of relatively high conductivity such as fire brick. The reason for this is easily seen when we realize that the quantity of heat passing through a portion of a solid wall by conduction depends upon the difference between the temperature of the two planes limiting the portion of the wall; while the difference between the fourth powers of the absolute temperatures of the surface enclosing the air space. It follows that in the case of the heat passed by conduction through the solid portion of the wall, the loss remains approximately the same so long as the relative temperatures of the two limiting planes remain constant, no matter what may be the actual temperatures of the two planes. On the other hand, the heat passing across the air space by radiation increased rapidly with the temperature of the enclosing surfaces although the difference between these temperatures may remain constant.

In most cases the substitution of a 4½" course of insulating brick for a course of common brick in furnace walls will cut down the loss by from 65 to 70 per cent. The comparison in heat loss between an insulated and an uninsulated furnace wall will be given below, losses being figured by the well-known formula for conduction through walls composed of two or more materials of varying conductivities:

$$H = \frac{T_1 - T_2}{\frac{1}{K_1} + \frac{d_1}{c_1} + \frac{d_2}{c_2} + \frac{1}{K_2}}$$

Where H is the total heat lost in B.t.u. per square foot of wall per hour.

T_1 is the temperature of the inte-

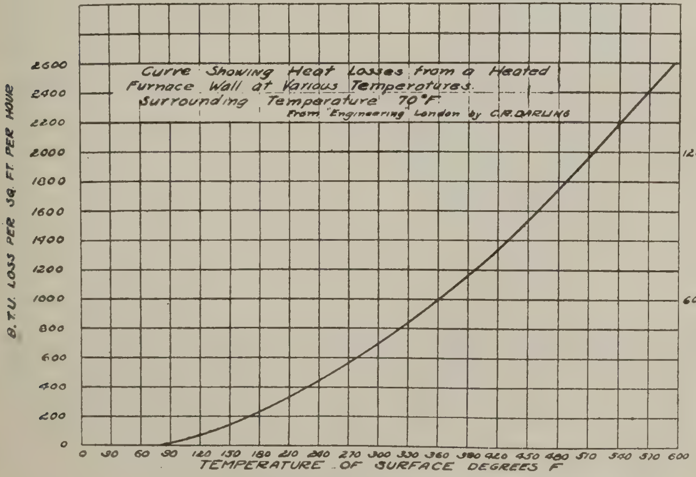


Figure 1.—Darling's Curve.

rior of the furnace.

T_2 is the temperature of the air surrounding the outside of the furnace wall.

K_1 and K_2 are constants for emissivity or surface resistance, K_1 covering difference in temperature between interior of furnace and interior brick wall, and K_2 the difference between the outside wall temperature and the air (for practical purposes K = 2 in both cases in the formula).

$\frac{d_1}{c_1} + \frac{d_2}{c_2}$ etc. = thickness in inches of each course of material divided by the conductivity in B.t.u. per inch of thickness of that course.

Assuming a furnace operating at 1800° F. (temperature of air 70° F.), with walls constructed of 9″ of fire brick and 8″ of red brick, taking the conductivities of the various components at their approximate mean temperatures from the chart Figure 2 and substituting for the formula we have:

$$H = \frac{1800\text{-}70}{\frac{1}{2} + \frac{9}{10} + \frac{8}{6.5} + \frac{1}{2}} = 552$$

B.t.u. per square foot per hour.

If, on the other hand, the wall were composed of 9″ of fire brick, 4½″ of insulating brick and 4″ of red brick, the heat loss would be:

$$H = \frac{1800\text{-}70}{\frac{1}{2} + \frac{9}{10.5} + \frac{4.5}{.68} + \frac{4}{6} + \frac{1}{2}} =$$

189 B.t.u. per square foot per hour.

In other words, without increasing the total thickness of the wall, the heat loss is cut down 66 per cent from that of the uninsulated construction.

Figure 2 shows the effect of insulating various thicknesses of walls at different temperatures. A

(Continued on page 48)

Air Temp = 100°F

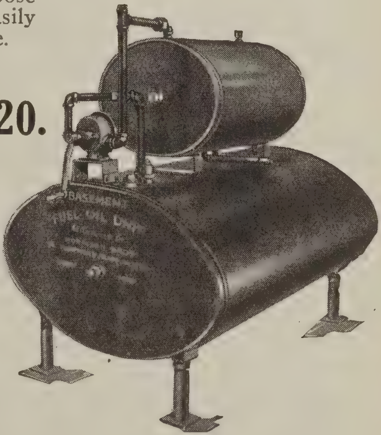
STRUCTURE OF WALL			TEMPERATURE OF FURNACE (°F)													
FIRE BRICK	S-O-C	RED BRICK	3000		2500		2000		1750		1500		1250		1000	
			B.T.U.	T.	B.T.U.	T.	B.T.U.	T.	B.T.U.	T.	B.T.U.	T.	B.T.U.	T.	B.T.U.	T.
18″	9″	4″	205	215	150	185										
18	4½	4	310	255	250	235										
18	2½	4	440	325	350	280										
18		4	880	545	715	455										
13½	9	4	210	220	155	190										
13½	4½	4	320	280	255	245	190	210	160	195						
13½	2½	4	470	335	370	290	280	245	235	225						
13½		4	1020	605	830	510	635	420	540	375						
9	4½	4	360	275	280	240	210	210	180	190	150	170	120	155	90	140
9	2½	4	500	355	405	310	310	265	265	240	220	220	170	200	125	175
9		4	1210	705	980	595	755	480	640	425	530	370	410	315	300	260
4½	4½	4							180	210	150	195	120	180	92	162
4½	2½	4							280	265	235	240	185	215	138	187
4½		4							790	490	660	415	530	355	400	280

Figure 2.—Heat Losses and Outside Wall Temperatures.

Compact Fuel Oil Tank Assembly Goes Into Basement

Rapid development in the fuel oil industry has brought out this perfected tank assembly. The 250-gal. supply tank is OVAL shape to clear the ordinary door for installation in the basement. Quickly assembled into a compact unit including 50-gal. auxiliary tank from which fuel oil is fed to the burner by gravity. Special hand piston pump fills the auxiliary tank from the supply tank. Overflow pipe returns any excess.

Accessibility is a real feature. No burying the tank underground or making an "eyesore" of the tank alongside the house above ground. All down in the basement where possible leaks or loose connections may be easily located. Absolutely safe.



Outfit Complete, $120.

Rotary Pump and Magnetic Gauge sold separately if desired.

Pump	**$12**
Gauge	**5**

Write for Literature

Morrison Bros.

"OIL EQUIPMENT HEADQUARTERS"

Dubuque, Iowa

The Boiler Control as a Safety Feature

More Important than Accurate Temperature Regulation

By J. C. Bogle*

BOILER controls serve two functions. One, which we have already discussed, is the prevention of overtravel in room temperature. The other is concerned with safety. Boiler controls make the automatic oil burner installation safer.

Consider the relative importance of safety as against closer temperature regulation. An entirely dispassionate view of the situation would lead one to stress the safety feature as being even more important than an accurate temperature regimen.

> *"THE essential requirement is for some form of dependable boiler control, either low-voltage or high-voltage, three-wire or two-wire. We prophesy that in the near future hot air installations will universally include this valuable provision for safety."*

But human nature reacts strangely toward the situation. There are available on the market, full lines of controls for hot air, hot water, steam, and vapor jobs. The percentage of hot air installations equipped with furnacestats is very low. Overtravel is not a great problem in hot air installations because the heating medium is the air actually discharged into the room, so the temperature lags are slight.

Though the desirability of the secondary control from a safety standpoint is still present in hot air applications, the secondary instrument is frequently omitted as it is not absolutely necessary for a satisfactory temperature regulation with hot air.

When one decides to omit boiler controls from the equipment of an automatic oil burner he should know what he is about. The safety feature is a valuable by-product. In no case should they be omitted merely to condense or cheapen the installation.

The boiler control is associated closely with the heating unit. It stands apart from the room thermostat and it observes an aloofness from its functioning. It is at the center of the web of radiating pipes or flues. Its response is to an integration of the stimuli which proceed from the entire heated zone.

The room thermostat is concentrated in its response. It may be located in a cubicle normally interconnected with a considerable area, but possibly to be blocked off by the closure of doors from any direct application of heat.

---

* Absolute Contactor Corporation.

For example, consider the room thermostat located in a small entrance hallway from which doors lead in every direction. Normally these doors are open, allowing free connection between the hallway, the dining room, the living room and possibly bed rooms, if the house is of one-story construction. It is conceivable that under certain conditions the thermostat will be kept cool and in the closed position while the balance of the house is being literally roasted by a continuous application of heat from the oil burner.

Would Operate Continuously

Suppose that small stream of cold air is playing on the thermostat while the rest of the house is unaffected thereby. Let us assume that a small pane of glass has been broken by a ball or slingshot from without while the house is temporarily unoccupied. So long as the thermostat is cold, the oil burner, in the absence of a boiler control would operate continuously, and in some cases disastrously.

Further, we must face the possibility of unpreventable failures, failures of wiring, of apparatus, of anything made by human hands, for only the wildest visionary can conceive perpetual performance without occasional error. Any chance of untoward result can be dispelled almost to the vanishing point when the primary controls are backed up by secondaries, commonly designated boiler controls.

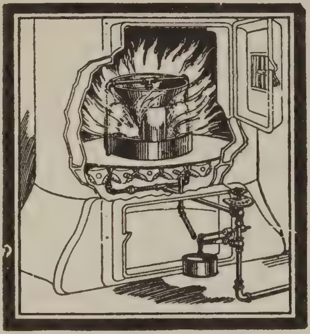
In this connection we maintain that the high voltage boiler control attains the highest degree of protection as it depends upon no interconnection with other automatic apparatus for its proper functioning. Where it is in the opened position it cuts off the whole energy supply directly. Thermostat and relay can be utterly incapacitated and even locked in the running position yet the high-voltage control remains potent to stop the moving parts.

But this added feature is not paramount. The essential requirement is for some form of dependable boiler control, either low-voltage or high-voltage, three-wire or two-wire. We prophesy in the near future hot air installations will universally include this valuable provision for safety.

California Fuel Oil Demand Rices

According to Railroad Commissioner Brundige, the consumption of fuel oil by the California state utilities during the year will amount to 10,000,000 barrels of oil against 3,000,000 barrels last year. The commissioner reports that the railroads in the state will use upwards of $40,000,000 worth of fuel oil this year.

A report published recently in **Fuel Oil** to the effect that R. P. Flower, who recently resigned from the Gill Manufacturing Company, manufacturers of the Gill oil burner, had become associated with the Cook Electric Company, Chicago, was incorrect, according to a letter from Mr. Flower, stating that he has not as yet made a permanent connection.



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Saving Heat with a Boiler Feed Regulator

The writer has a number of times been asked "Just how much heat should a good boiler feed regulator save?"

I have seen reports by users in which it was shown that the savings range all the way from 2 to 8 per cent in fuel costs. The average is 4 per cent, and that is the figure that I would advise anyone to use who is figuring on installing first-class regulators.

Regulators don't cost very much, compared with the savings they effect in a year's time, and are almost invariably a good investment. The ideal regulator stabilizes the boiler water level within the safe limits which have been carefully set. It temporarily increases the feed rate at every sudden drop in the load and stores up surplus furnace heat in the form of heated water. Then when the peak load comes on, it momentarily cuts down the feed water input and uses the "stored heat" over the peak without permitting a heavy influx of cold water.

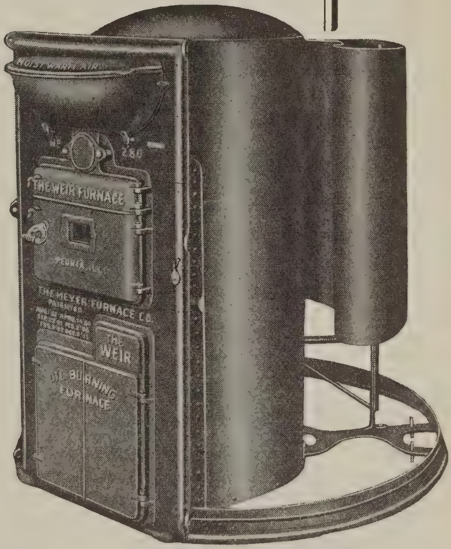
Besides, there are other important savings such as: less wear and tear on heaters; economizers; feed water pumps; pipe lines; and much of the boiler operator's time is released for other work that cannot be done automatically.

W. F. Schaphorst, M.E.

Complete lists of the various shapes and sizes of fire brick for linings, arches and walls are given in a folder sent out by the A. P. Green Fire Brick Company, Mexico, Mo.

The WEIR
Oil-Burning Furnace

the one
proven
warm air
furnace
for oil
burning



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The Meyer Furnace Company
Peoria, Illinois

"Coil" Heating Boiler

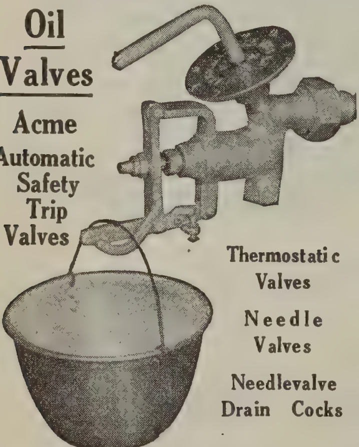
Steel Shells—Copper Coils
Steam—Vapor—Water
For residences, apartments, garages, etc.

Large Combustion Chamber.
ALL heating surface exposed to the radiance of the fire.
Steel and Copper Will Not Crack Under This Strain.

Write for catalog.

Representatives wanted in territory not at present covered.

MONITOR BOILER COMPANY
1505 Race Street - Philadelphia, Pa.



Oil Valves

Acme Automatic Safety Trip Valves

Thermostatic Valves

Needle Valves

Needlevalve Drain Cocks

Acme Brass & Machine Works
609-611 East 17th St. Kansas City, Mo

Many New Burner Manufacturing Firms Incorporated

Announcement has been made of the recent incorporation of the Rotary Oil Burner Company, Univeristy City, St. Louis, Mo., with a capital of $10,000. The new company, which will market as well as manufacture burners, was incorporated by F. J. Dahl, J. R. VanDyke, W. R. Wild, C. D. Smuley, Jr., and Spencer M. Thomas. Another new organization is the Automatic Oil Heating Corporation, New York City, which was incorporated for the purpose of manufacturing oil burners and oil burning equipment, with a capital of $80,000. The company will also handle the New York distribution of the Electrol burner, manufactured by the Home Appliance Corporation, St. Louis, Mo. R. S. Beale is vice-president and manager of the new concern. Still another recent incorporation was that of the Oil-Water Burner Corporation, Honesdale, Pa., which announced a capital of $120,000. The incorporators are A. W. Paterson, Jerome W. Leverich, W. L. Houck, Charles Forshey and M. H. Knight.

New incorporations during the month of November included the Blue Blaze Burner Company, Kansas City, Mo., capitalized for $15,000, to manufacture burners, by L. H. Borserine, J. R. Steele and H. C. Waltner; and the J and L Oil Burning System which was incorporated in Chicago, Ill., with a capital of $50,000, to manufacture burners, by Lyle S. Abbot, Benjamin B. Jones and Frank Lochner.

Fuel Oil Burning in the United States Navy*

By Lieut.-Com. H. G. Donald, U.S.N.

(Continued from the December Issue)

THE furnace design is a particularly difficult problem in naval oil-fired boilers. Due to necessarily limited deck height and width of boiler room the furnace is not over 4 ft. deep below the bottom of the headers in a B. & W. drums of the "A" (express) type cross-drum boiler or below the mud boiler. The fore-and-aft inside length of the funace is usually between 7 and 8 ft. Ten pounds of oil is normally burned per cubic foot of furnace volume; and a rate of 15 lb. per cu. ft. with a CO_2 of 13 per cent and excess air of only 19.5 per cent has been accomplished. The furnace temperature is taken as 3000 degrees F. although this is probably not equalled until the combustion rate has equalled 11 lb. per cu. ft. of furnace volume.

High Temperature Test

The refractory used is subjected to a temperature of 3000 degrees F. in a simulative service test of 24 hr. duration. Practically no trouble is had with refractories of either molded brick form or plastic brick. This is due in great measure to the character of the insulation used. Cement washes or glazes are not used and are considered undesirable.

On account of the light construction of the casing, occasional furnace vibration due to "panting" in the furnace, and the shock of gun fire it is necessary to anchor each individual brick with a bolt.

Material Hard to Find

It has been very difficult to find a suitable material for these anchor bolts when the furnace insulation outside of the 4.5-in. refractory is greater than 2.5-in. in thicknesss. Because of the limited cubical as well as linear space in naval fire rooms, when using open fire room with blowers on the burners operating, the temperature of the floor plates or burner operating level will easily reach 130 degrees F. with an outside air temperature over 70 degrees F. Therefore, from the standpoint of comfort of personnel alone, it has become necessary materially to increase the thickness of furnace insulation, a problem still under investigation as it is complicated by oxidation of the anchor bolts. Past practice called for a 2-in. air space with 1 in. of insulation outside. The furnace floors are built up of 2.5 in. of diatomaceous earth and two staggered courses of 2.5-in. split brick. When double-bottom compartments are located under the boilers, the thickness of the diatomaceous earth is increased to 4.5 in.

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* Presented at the Annual Meeting, December 1 to 4, 1924, of The American Society of Mechanical Engineers.

[1] Fuel-Oil Testing Plant, U. S. Navy Yard, Philadelphia, Pa.

High-speed vessels are using oil of 18 to 22 degrees B. and some capital ships are using oil as heavy as 12 degrees B. Oil for naval use is divided into four classes, viz:

Class	Maximum Viscosity, Seconds Saybolt Furol
Bunker A	100 at 77 deg. F.
Bunker B.	100 at 122 deg. F.
Bunker C	300 at 122 deg. F.

The flash point is limited to 150 degrees F., and water and sediment combined must not be over one per cent.

Reduce Viscosity

The type of atomizers used will produce a fine-mist, non-streak atomization when the oil is heated to reduce its viscosity to 150 sec. S.U.V. Heaters are designed to raise the temperature of the oil from 70 to 300 degrees F. Satisfactory atomization can be obtained at a pressure as low as 125 lb. gage and the maximum high limit is 300 lb. The atomizers are connected to the manifold across the boiler front by semi-flexible ⅜-in. steel tubing 1/16 in. thick, it being found that very little movement of the atomizer from the designed position is necessary to take care of a variation of spray angle due to pressure change. The spray angle is 70 degrees (total) for high capacity and about 55 degrees for low capacity. The angle of the brick cone at the burner opening in the furnace front is 45 degrees, with a thickness parallel to the atomizer axis of 9 in. It is customary to supply only three sizes of orifices, one for port use, one for cruising, and one for full power. Owing to the

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and
on the Seven Seas

RAY BURNER

10,000 Ray Burners
Now Operating In
All Parts of the World

A Mechanical Masterpiece
That

Burns Cheapest Grades of Fuel Oils

Made in over 30 Different Sizes and Types

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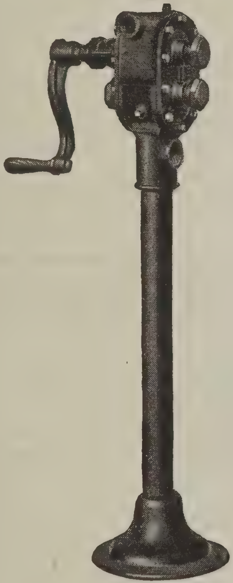
PUMPS FOR OIL BURNERS



are dependable, quiet in operation and are built to give long, efficient service, even under exceptional conditions.

Fig. 3512 illustrated at the left is a hand pump for use in connection with domestic installations and is arranged for both side suction and connection thru base and stand pipe. It is always primed and surprisingly easy to operate.

Capacity at 100 turns per minute, 12 gal.

Other tyes of Trahern Transfer pumps can be furnished for both hand and power use to take care of every oil burner need, whether large or small.

Let our engineers help you select the proper pump for your installations. No obligations.

LEADER-TRAHERN COMPANY

Decatur, Illinois

Plants: Decatur and Rockford, Illinois

New York City
21 E. 40th St.

Chicago, Ill.
327 S. LaSalle St.

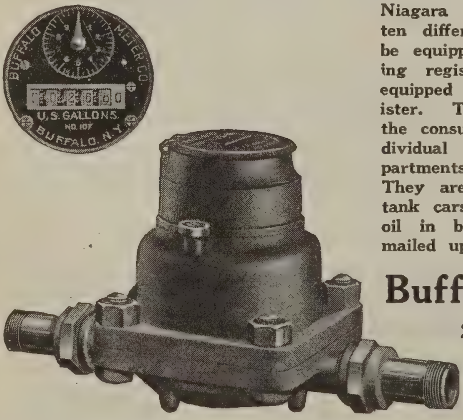
high boiler rating, it is difficult to locate the necessary number of burners on the limited area of the furnace fronts. The smaller-size burners are placed as close as 22 in. between centers, and the larger-size 25 in. between centers. The distance to the floor, side walls and tube banks is made at least 22 in. for the smaller burners and 30 in. for the larger ones. Trouble has been experienced with blow-torch effect on the tubes exposed to the furnace in the large-tube water-tube boilers in which the tubes have an inclination to the horizontal of only 15 degrees. This trouble has been corrected either by relocating the burners or by tilting them below the horizontal.

The question of relative cost of operation of coal and oil burning ships is not a naval one, the superiority of oil over coal being decided rather on military merits. The Navy will never return to coal burning.

New Folder Describes the Ray Oil Burner

Comprehensive, fully illustrated folders on the Ray oil burner have been issued by the Preferred Utilities Company, New York City. The Ray, which it describes, is a power burner, employing the direct-connected, revolving nozzle principle. The oil is whirled into the combustion chamber with an exceedingly swift motion, giving the flame a swirling, clockwise direction that is supposed to give efficient combustion and long flame travel. Numerous features and advantages of the Ray Burner are also listed in the folder.

NIAGARA OIL METERS



Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.
2926 Main St.
Buffalo, New York

Demand and Production of Fuel Oil Rise in October

October production of gas and fuel oils in the United States totalled approximately 1,161,000,000 gallons, a daily average of 37,441,400, which was an increase over the previous month of more than 300,000 gallons per day. The month's production total, however, was approximately 6,000,000 gallons less than the total for August of 1924 and about 9,000,000 less than the total for October of 1923.

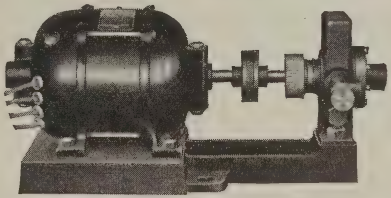
Imports increased almost 50 per cent over September and reached the total of 41,137,000 gallons. This was still about 8,000,000 gallons less than the September total, however, but was nearly 10,000,000 gallons greater than the October of 1923 figure.

A drop of nearly 11,000,000 gallons from the September figures was suffered by the export total which approximated 134,983,000 gallons, about 19,000,000 gallons less than the exports for August of 1924, but 3,000,000 more than October of 1923.

Domestic demand, in keeping with the gradually lowering temperature throughout October, totalled the record figure of 1,095,853,000 gallons, which was 85,000,000 gallons more than the September total and 88,000,000 gallons more than the August total. Nothing is more indicative of the widely increased use of fuel oil than the great increase over the total for October of 1923, which total was but 1,015,314,000 gallons.

Continuing the decline which be-

"PAUL" Type "RRO" Oil Pump



The "PAUL" Type "RRO" Oil Pump is a revolving reciprocating pump with double acting piston of positive displacement, the clearance is zero. It is positive in action, capable of working against high suction lifts, is perfectly balanced, noiseless in operation and will handle light or heavy oils. These are a few of the many features which make the "PAUL" Type "RRO" Oil Pump ideal for use in connection with domestic or industrial oil burner installations.

FORT WAYNE ENGINEERING & MFG. CO.
Home Office and Factory
FORT WAYNE, INDIANA
Ask for Bulletin No. 5030

gan in August of 1924, the stocks of gas and fuel oils on hand at refineries in the United States dropped to 1,611,585,000 gallons, which represented a 47 day's supply for the nation at the October rate of consumption. This total was a decrease of approximately 30,000,000 gallons from the September total which was about 20,000,000 gallons below the August total. Stocks on hand November 1, 1923 totalled by 1,015,314,000 gallons.

Peabody Introduce Combined Oil and Gas Burner

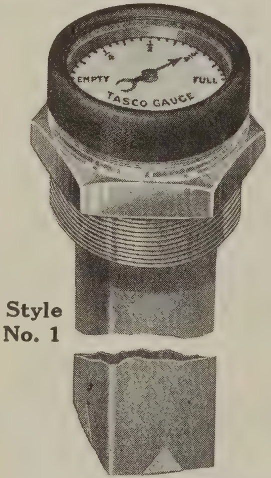
In the combined gas and oil burner which was placed on the market recently by the Peabody Engineering Corporation, New York City, the gas burner is located between the furnace front and the air register, the standard Peabody-Fisher burner and Peabody air register being used. The burner is so constructed that the gas enters the furnace in a thin conical sheet. It is possible to burn oil and gas simultaneously with this burner, which, according to literature issued by the Peabody Corporation, is said to facilitate the change from one fuel to the other.

Descriptions of every type of furnace in which Marion Esso Bond plastic furnace cement may be used are contained in a pamphlet that has been issued by the Marion Machine Foundry, Marion, Ind.

According to J. B. Hutchinson, secretary of the International Railway Fuel Association, 41 railroads in this country and Canada are burning fuel oil in their locomotives.

"Tasco" Gauges

are standard equipment on more than 50% of all Fuel Oil and Oil Burning devices on which gauges are used.



There are types for installation in ends, tops or sides of tanks—either with our standard flanges or with 1½ or 2 inch I P threads.

Send for complete information on different styles

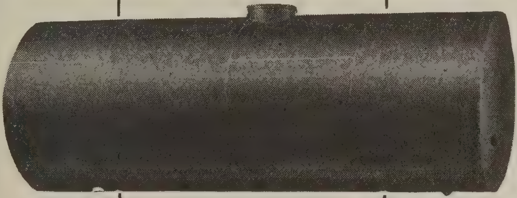
The Akron-Selle Co.
"40 Years in Business"
Akron, Ohio

Priceless!

Correct advice and information on so important a part of any oil burner installation as the selection of a tank, is priceless.

We issue a booklet, "Fuel Oil Tanks for Oil Burning Equipment," that is probably the most complete discussion of its kind ever published. Practically every question one would ask about tanks is answered in it. Included also is constructive information on Butler Built tanks.

Butler Horizontal Welded tanks are made in eight different sizes, from 555 to 3155 gallons capacity of 10, 12 and 14 gage blue annealed, copper bearing, steel. Furnished with manhole and necessary tappings.



Write for this booklet today if you want accurate tank information.

Two conveniently located factories provide prompt shipments to all sections of the country.

Butler Manufacturing Company

1322 Grand Ave.
Kansas City, Mo.

Minneapolis, Minn.

Consumption of Fuel Oil by Power Plants Increases

1924 Total Shows Sharp Rise Above 1923 Total.

By F. F. Ettinger

DAILY consumption of fuel oil by the electric public utility power plants in the United States during the first 10 months of 1924 exceeded the daily average consumption for 1923 by 15 per cent, according to figures released recently by the U. S. Geological Survey. The 1924 average daily consumption, from January 1 to December 1, reached the record figure of 46,550 barrels. This is an increase of 10,250 barrels over the daily average for 1922 and of 16,000 barrels over 1919.

Daily Consumption Drops

Daily total consumption during October of 1924 dropped 900 barrels from that of September and reached 45,200 barrels. Low for the year was reached during May, when the daily consumption was but 39,000 barrels, and the high point of the consumption curve was passed in February when daily consumption rose to 53,200 barrels. A table of the daily consumption of fuel oil by electric public utility companies in the United States for August, September and October of 1924 (in barrels) follows:

Division	Aug.	Sept.	Oct.
United States...	1,502,477	1,389,264	1,401,624
New England.	114,796	110,853	130,168
Mid. Atlantic..	24,699	23,843	26,791
E. N. Cent....	2,516	3,953	3,783
W. N. Cent...	104,211	108,483	103,592
S. Atlantic....	99,962	105,326	111,351
E. S Cent....	20,843	19,029	17,120
W. S. Cent....	359,133	320,187	321,176
Mountain......	21,761	21,893	23,516
Pacific.........	754,556	675,697	664,127
New England			
Maine	9,794	1,862	10,241
N. Hampshire.	0	0	0
Vermont.......	8,322	3,617	3,120
Massamusetts.	29,345	30,782	37,341
Rhode Island..	66,616	73,407	78,236
Connecticut....	719	1,185	1,230
Middle Atlantic			
New York.....	23,934	22,640	25,591
New Jersey....	701	698	745
Pennsylvania ..	64	505	455
East North Central			
Ohio...........	835	899	959
Indiana........	615	662	778
Illinois	176	210	201
Michigan.......	633	1,834	1,418
Wisconsin......	257	348	427
West North Central			
Minnesota......	782	863	919
Iowa...........	2,473	2,332	2,207

Average daily consumption of fuel oil by electric public-utility power plants in the United States.

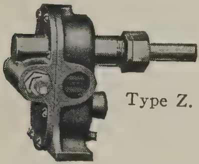
Month	1919	1920	1921	1922	1923	1924
January..............	21,900	41,600	28,900	35,700	40,500	52,200
February.............	21,900	40,300	27,900	35,600	41,600	53,200
March................	20,400	34,200	27,400	30,600	35,200	49,700
April	19,400	30,400	28,100	27,500	32,700	41,100
May	23,300	29,800	27,500	27,600	32,600	39,000
June..................	29,000	35,900	30,500	30,700	34,500	44,800
July..................	32,100	38,400	33,200	32,600	37,900	45,500
August..............	34,600	38,700	37,600	42,300	43,600	48,500
September...........	37,100	40,700	39,700	45,400	44,200	46,300
October	39,000	37,700	38,100	42,200	44,500	45,200
November	41,700	32,000	38,200	41,300	46,100	
December............	40.800	30,600	38,400	42,200	47,200	
Year.............	30,300	35,900	33,000	36,200	40,200	46,550

Oberdorfer Pumps

FOR FUEL OIL BURNERS

OBERDORFER BRONZE PUMPS (Type Z) meet every requirement of oil burning devices using a pump feed into the combustion chamber. An adjusting screw controls metering the oil and a by-pass within the pump relieves all overflow without the necessity of a return line. Adaptable to themostatic control.

For pumping oil from storage tank to supply tank the Oberdorfer Motor Driven Pump with automatic float switch is guaranteed to provide an even flow of fuel up to 400 gallons per hour.



Type Z.

For domestic installations where automatic fuel control is not essential the Oberdorfer hand pump is easy to operate — simple in construction and non-leakable.

Write for catalogue and name of nearest dealer.

M. L. OBERDORFER BRASS CO.
SYRACUSE, N. Y.

Oil Burner Castings

IRON AND BRASS **UNFINISHED OR MACHINED**

Various parts of oil burners require different qualities of iron for their particular use. Some require close grained leak proof or heat resisting qualities; some require soft iron for a large amount of machine work; some can be rough castings where finish is of no particular importance.

Our five foundries and machine shop insure you of our ability to take care of your requirements in every respect.

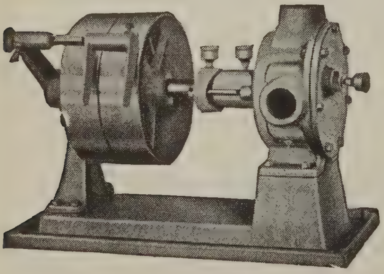
Chicago Hardware Foundry Co.
North Chicago, Illinois

Missouri.......	12,181	13,888	10,017
North Dakota..	270	388	336
South Dakota.	3,443	3,621	3,518
Nebraska......	8,990	7,990	8,794
Kansas........	76,072	79,401	77,801
South Atlantic			
Delaware.......	0	0	0
Maryland......	79	81	80
Dist. of Col....	0	0	0
Virginia........	497	574	440
West Virginia..	0	0	0
North Carolina	150	150	150
South Carolina.	234	254	243
Georgia........	19,760	20,843	22,917
Florida........	79,242	83,424	87,521
East South Central			
Kentucky......	442	430	450
Tennessee......	502	492	532
Alabama.......	2,957	2,688	45
Mississippi	16,942	15,419	16,093
West South Central			
Arkansas......	28,394	25,988	33,117
Louisiana......	57,291	54,704	57,398
Oklahoma......	40,352	36,536	37,270
Texas..........	233,096	202,959	193,391
Mountain			
Montana	254	257	270
Idaho..........	0	0	0
Wyoming......	4,124	4,231	5,641
Colorado	0	0	0
New Mexico...	690	756	880
Arizona........	16,377	16,155	16,098
Utah	0	0	0
Nevada.........	316	494	627
Pacific			
Washington...	40,095	31,637	25,232
Oregon	4,522	2,128	1,539
California......	709,939	641,932	637,356

Issue a Booklet on Refractory Materials

Mack Engineering and Supply Company, New York City, manufacturers of refractory materials, have issued a booklet on Mack products. It contains some clear diagrams of boilers using Mack baffles, and describes the use of Mack cement and paint.

Bigelow two-pass boilers are described in a folder that has been published by the Bigelow Company, New Haven, Conn.



VIKING PUMPS

Fast, Steady Pumping

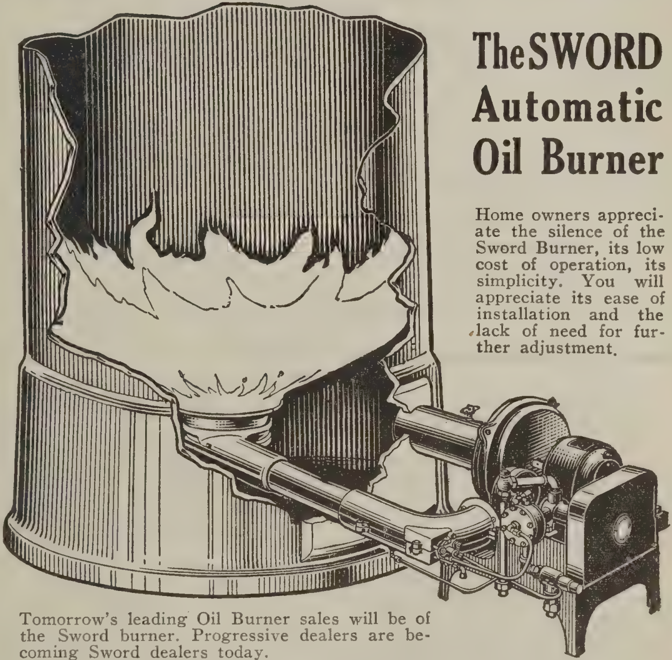
Fuel oil pumping is at its best when a Viking Rotary Pump is on the job. An improved pumping principle that involves a simple design gives positive pumping at low operating cost. There are but two moving parts—that's why the Viking has long life.

Viking Pump Co.

Cedar Falls,
Ia.

Send Name for Catalog

Places Dealers At A Distinct Advantage



The SWORD Automatic Oil Burner

Home owners appreciate the silence of the Sword Burner, its low cost of operation, its simplicity. You will appreciate its ease of installation and the lack of need for further adjustment.

Tomorrow's leading Oil Burner sales will be of the Sword burner. Progressive dealers are becoming Sword dealers today.

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PHILADELPHIA, PENNSYLVANIA

BRASS FITTINGS
for
OIL BURNING SYSTEMS

Let us estimate on your requirements for standard or special brass pipe and tube fittings.

COMMONWEALTH BRASS CORPORATION
5781 Commonwealth Ave.,
DETROIT

Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers". It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York

Branch Offices in the Larger Cities

STOPPING HEAT WASTE BY HIGH TEMPERATURE INSULATION

(Continued from page 30)

comparison of insulated and uninsulated walls of the same thickness is shown in the fourth and sixth lines, both walls being 22", the one having 18" of fire brick and 4" of red brick and the other 13½" of fire brick, 4½" of insulation and 4" of red brick. Heat losses in the insulated wall are 320 and 255 B.t.u. at 3000° F. and 2500° F. respectively, as compared with 880 and 715 B.t.u. for the uninsulated wall, a saving of 63 per cent by substituting insulating brick in place of one course of refractory.

Insulation is now being successfully applied to practically all types of equipment, including boilers; many types of furnaces; core, coke, baking and enamel drying ovens; oil stills and storage tanks; water gas sets and coal gas retorts; hot blast stoves and mains; soaking pits; brick, lime and cement kilns; glass annealing lehrs; etc.

Many Other Advantages

There are a number of other important advantages in addition to fuel saving, which result from the insulation of high temperature equipment, among them being:

1—Greater uniformity of temperature and elimination of "cold" corners, obviating overheating certain portions of the equipment in the endeavor to bring the remote parts to the required temperature. Uniform temperatures are important in all cases but especially so in glass annealing, heat treating, brick, porcelain and pottery manufacture, oil refining, lime burning, and bread baking. For instance, in the burning of brick in periodic kilns it is often impossible with uninsulated equipment to attain the proper temperature in the kiln bottoms, with the result that a considerable portion of the ware is improperly burned and saleable only as second quality product. By thorough insulation, including the base, much more even heat distribution is possible.

2—Increase in capacity of the equipment.

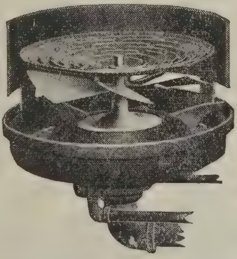
3—Permitting greater accuracy and ease of temperature control.

4—Protection to brick work from rapid temperature changes, reducing internal strains and cracking and resulting air infiltration.

5—Creating better working conditions around the equipment, increasing the comfort and efficiency of the employees.

In designing equipment for all applications of heat in industrial processes, there are a great many factors as well as that of heat insulation, to be taken into consideration, among them being temperature control equipment and the kind of fuel and refractories most suitable. Of these, the intelligent use of insulating materials is one of the most important factors contributing toward economical operation.

Charles Cory & Son, Inc., of New York City, manufacturers of signaling and communicating devices, have announced the addition to their line of a new seamless flexible tubing suitable for oil burner use.



The Rotary Oil Burner

is designed for use in steam and hot water heating systems, hot air furnaces, water heaters, ranges, etc. It produces maximum furnace efficiency by vaporizing the oil and mixing the oil-gas with the proper amount of oxygen, at the point of combustion. Uses fuel distillate of 27 to 36 gravity.

ROTARY MANUFACTURING COMPANY
1526 Santa Fe Avenue Los Angeles, Calif.
Eastern Manufacturer, 1934 Market St., Philadelphia, Penn.
Established 1908 Handled by distributors
Chicago, St. Louis, San Francisco, Oakland and others.

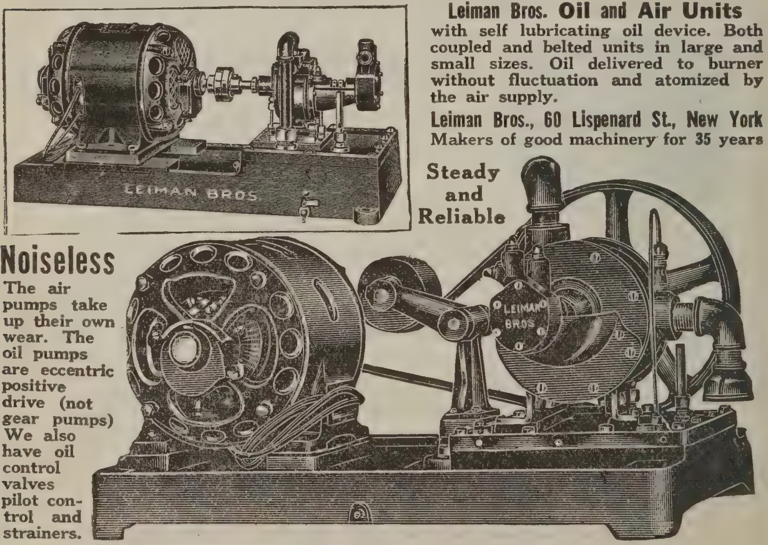
COMPLETING THE SURVEY FOR OIL BURNER INSTALLATION

(Continued from page 15)

taken into the basement, in localities permitting of this kind of storage, recommendation should be made regarding the use of special size or rectangular tanks or small tanks connected in battery. In business districts in some localities where there is no room for outside storage, it frequently has been necessary to have a thousand gallon tank welded in the basement after having been delivered in sections. It is essential of course that notations of such necessity be noted on the layout sheet.

Basement Depth Important

The depth of the basement should also be considered by the inspector with regard to ground level in layout of underground tanks on the layout sheets, so as to avoid siphoning and at the same time permit the correct drop on return lines from automatic pump to the tanks. Notations should be made of the necessary depth at which the outside storage tank should be buried. Where a fill pipe is run from an inside supply tank to alley or curb, the basement should be low enough to allow sufficient pitch from fill cap to tank. One instance recently came up where the installation was to be equipped with an eighty-foot pipe from curbing to the inside 200 gallon tank. The lawn sloped from the house to the street and the fill line emerged from the lawn about half way between the house and the curbing and would have crossed the sidewalk two feet above ground if continued.

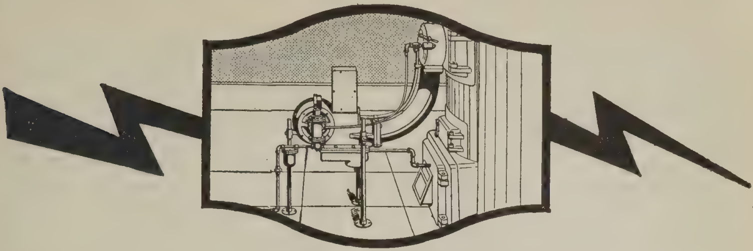


Leiman Bros. Oil and Air Units
with self lubricating oil device. Both coupled and belted units in large and small sizes. Oil delivered to burner without fluctuation and atomized by the air supply.

Leiman Bros., 60 Lispenard St., New York
Makers of good machinery for 35 years

Steady and Reliable

Noiseless
The air pumps take up their own wear. The oil pumps are eccentric positive drive (not gear pumps) We also have oil control valves pilot control and strainers.



The Truth About Electric Ignition

Electric spark plug ignition of oil for heating purposes was successfully achieved more than 15 years ago.

In June 1919, this principle was first applied to domestic oil burners. Its practicability was demonstrated in the winter which followed.

The development of electric ignition for oil heaters was carried out by the engineers who designed the Electrol Automatic Oil Burner. When false or misleading claims are made that electric ignition in oil burners has now been perfected or developed for the first time by any one, this can be characterized in only one way.

Yet these claims are natural enough. The price of pioneering is always imitation. The penalty of leadership is always the envy of those who only follow.

When false claims are made in advertising (as they have been made concerning the development of electric ignition for oil burners), we must remind you that "truth in advertising means honesty in product."

HOME APPLIANCE CORPORATION
2818 Locust Blvd. St. Louis, Mo.

The Electrol Automatic Oil Burner is the perfected oil burner with the added essential feature of entirely automatic electric ignition. Some desirable territory is still available. Write for particulars.

(Scott-Newcomb System)

ELECTROL

Electric Ignition Quiet Operation

AUTOMATIC OIL BURNER

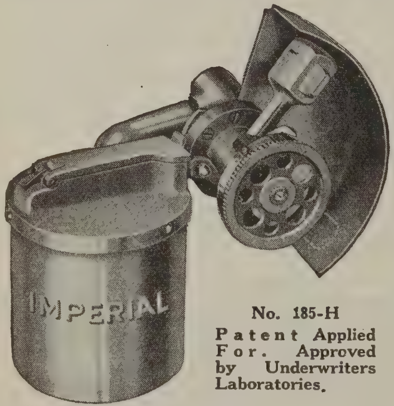
With tank and thermostat locations determined, a plan of the basement in the space provided in the installation sheet should be made. This should give general dimensions of the basement with compass directions. Location of the boiler, chimney, meters, gas and electrical, electrical service box at which circuit is to be connected, gas connection, tanks and course of oil line, should all be shown on the plan. Any additional or special information should be given.

Equip With Transit Apron

It is customary, of course, at this time to equip all installations with a transite apron where the grate diameter of the boiler is less than nineteen inches or where larger burners are required on account of peculiarity of the type of the boiler or where the grate is not of sufficient size, as well as all installations of the twenty-inch burner. The inspector should also make notes on the reverse side of the sheet regarding any baffle work that should be removed or closing up of magazine in magazine feed boiler in advance of initial installation, special boiler covering work, etc.

Meters Are Tagged

In the event there is more than one set of meters in the basement the inspector should investigate to ascertain to what meters the connections should be run, tagging these meters clearly for the installation crew and noting on layout sheet that meters are so tagged. The size of the fitting required to connect the gas line to the gas main also must



IMPERIAL OIL CONTROL AND SAFETY TRIP VALVE

No. 185-H
Patent Applied For. Approved by Underwriters Laboratories.

Positive in operation, easy to install and meets all service demands better than any other valve.

Other Imperial Oil Burner Specialties are:

Safety Trip Valves
Indicator Valves
Oil Strainers
Shut-off Cocks
Needle Valve Drain Cocks
Copper Tubing
Oxygen Carbon Burning Outfits
Brass Pipe Fittings
Tubing Couplings
Angle and Globe Needle Valves

Write for catalog giving complete information about prices, sizes and installations.

IMPERIAL BRASS MFG. CO. 1224 W. Harrison St., Chicago

be shown.

The bills of material which constitute the third part of the survey sheet should include three sections and be in duplicate. The first section contains description of all parts or material required. The size and quantities should be filled in by the inspector. The second section covers material for special tanks, valves, fittings, etc. The third covers all necessary material for proper installation of an electric automatic pump, should this method of installation be desired. Duplicates of these should be sent to the stock room before installation. The stockkeeper should get a signature from installation crew at time of delivery of material to them and then return his duplicate to the engineering department, who at the proper time will turn them over to the accounting department.

The complete survey reports consisting of the three sections are returned by the inspector to the engineering department where they are checked over. If the heating system is found acceptable, the size of the burner required is entered on the inspection sheet and approved by the head of the department. In the event the survey is made after the order has been taken by the salesman and it develops that a larger size burner is required than the one originally sold, the order then should be returned to the sales department and the owner resold on the correct size. If the survey is a pre-sale survey or the burner required checks with the burner originally estimated by the salesman, then the matter is ready for attention of the installation crew on the date specified.

M-D-CO. Pump Construction Prove the Application of Good Common Sense

It is a well-known fact that the more moving parts embodied into a mechanical unit the more chance for trouble. The additional chances for wear and leakage.

All M-D-CO. Pump principles have but three moving parts; one within the other. The unique sliding action while in rotation is remarkable in the respect there is absolutely no friction in its action, non-pulsating in its performance.

M-D-Co. Pumps are not an ordinary lubricating pump, but built to handle fuel oils where efficient pumping is necessary to eliminate that costly servicing.

M-D-Co. Hand Pumps for transferring by hand, having capacity 10 to 20 gallons per minute.

M-D-Co. Direct Drive Rotary Pumps operating at standard motor speed in sizes having capacity 30 gallons per hour to 35 G.P.M.

M-D-Co. Pumps, automatically controlled by Mercury Switch.

Send for catalog containing complete information also engineering data which will assist you to overcome your pump troubles.

MECHANICAL DEVICES COMPANY
Main Office and Factory: Aurora, Illinois

CHICAGO OFFICE
549 W. Washington Blvd.
Phone: Franklin 2471

Eastern Office
325 Federal Street
GREENFIELD, MASS.

OIL BURNING RESEARCH

(Continued from page 22)

draft the oil flow and the ashpit opening were adjusted so as to completely burn a maximum amount of oil. As the check damper was closed, or the draft increased thru any other means, more air was drawn thru the burner and the flame burned more brightly. At the same time the overall efficiency was somewhat decreased but not seriously so.

In actual practice it is particularly essential that this procedure of adjusting the burner at minimum draft be followed in order to avoid many of the undesirable consequences which result from an improperly adjusted burner. It is not uncommon to find the burner adjusted for maximum combustion without regard to draft pressure. If for any reason the draft pressure is decreased below that at which the burner is adjusted, incomplete combustion results, due to lack of sufficient air.

This particular study illustrates the effect of increasing the draft pressure after the burner has been set to operate at minimum draft. Further study has shown that the capacity of the burner may be increased as the draft pressure is increased, i. e. more oil can be completely burned as more air is pulled into the furnace. This permits an adjustment of the oil flow to provide for those periods when the draft is increased due to atmospheric conditions requiring higher duty from the boiler.

(*This chapter concludes Mr. Meikle's paper.*)

What is *Your* Motor Record?

Mr. W. T. Dean, of the Combustion Fuel Oil Burner Company, in answering a recent inquiry about Ohio Motors writes:

"Without attempting to count, I should guess we have used 1500 to 2000 of their motors during the past three years. So far as I know, we have called on them only once for service outside of this immediate vicinity."

It is such motor service that has made Ohio known as the *"Reliable"* Motor.

The Ohio Electric and Controller Company
5920 Maurice Avenue Cleveland, Ohio

"I want the agency for my son"

Said a Railroad President

"As soon as I saw the ABC flame, I said, 'That's the burner I want.'"

This president is no swivel-chair officer. He has been through the mill. When it comes to a thorough knowledge of combustion, there are few engineers who excel him.

His eyes told him that ABC did not carbonize. Unique means of atomization breaks up the oil so that it burns completely.

His ears told him that ABC is quiet. It has no noisy, and heat-extravagant, fan or blower.

ABC Attracts Big Men

All of our agents are high-salaried men. They are men of vision, men who see hugh profit possibilities in an ABC exclusive agency.

We want to send the facts to executives of their type. Do you come up to the standard we have set? Then let us tell you about the "fastest selling oil burner."

AUTOMATIC BURNER CORPORATION
312 No. May Street, Chicago

ABC OIL BURNER
no noise ~ no carbon

Consulting Page

Editor FUEL OIL:

Answering the inquiry of "K. S., Seattle, Wash.," which appeared in the Consulting Department in your December issue, radiant fireplace burners that use kerosene are made by the Everbrite Stove Company, Kansas City, Mo.—H. L. W., Kansas City, Mo.

Editor, FUEL OIL:

We note that in your December Consulting Department, "K. S., Seattle, Wash.," requests the name of a company that manufactures radiant fire-place burners which burn kerosene. Such burners are made by the Superior Oil-Gas Burner Company, Chicago, Ill.—A. W. F., Chicago, Ill.

Q. In your December issue, Page 24, you refer to a booklet on fuel oil that has been issued by the Union Oil Company of California. Where can we obtain a copy of this booklet?—F. E. W., Hartford, Conn.

Ans. Write to the Union Oil Company of California, Union Oil Building, Los Angeles, Cal.

Q. Our heating plant is equipped with two cast iron "Ideal" down-draft boilers rated at 13,750 square feet of radiation. We have one of these boilers equipped with an oil burner and, although it handles our heating problem very well, we would like to know if it would be more efficient to equip the other boiler with an oil burner also and operate both boilers with with a small amount of fuel. Our connected boiler load is 19,000 square feet of radiation. Also, what is the best way of placing firebrick in the firebox to get the greatest efficiency?—H. L. A., Canton, Ohio.

Ans. It is the opinion of our consultant that when making an installation in a 13,750 square feet radiation down-draft boiler, the burner should be placed in the rear of the fire-box, firing toward the door, to cause the flames to reverberate up through the water grates and into the crown sheet section. The lower section of the grates should be taken out and the ash pit lined with brick on the sides. A false floor should be put down so as to permit the air to pass under it and become preheated, the better to support combustion. A boiler run at a certain percentage overload or under rating is inefficient, so it might be well to install a burner in the second boiler to use in emergency or when it was apparent that the first boiler had been over-rated in continuous operation. Over-rating is indicated by an excessively high temperature or an existing temperature 150 degrees hotter than the steam temperature in the boiler. This type of boiler is most difficult to fire successfully with oil and much of the trouble experienced with it is due to the fact that the heating chamber above the water grates is not being utilized.

Q. Where can I get in touch with the secretary of the American Society of Heating and Ventilating Engineers?—I. N. S., Brookline, Mass.

Ans. This society has offices at 29 West 39th Street, New York City.

Q. On page 69 of your November, 1924, issue is a small article telling about experiments for covering for warm air furnace pipes. Will you please tell me where a complete report of these experiments can be obtained?—T. B., Chicago, Ill.

Ans. You can probably get the entire report from Allan W. Williams, secretary, National Warm Air Heating and Ventilating Association, Columbus, Ohio.

Q. I am interested in obtaining an American dictionary of technical expressions as to petroleum, refining oils, etc. Has any book of this nature been published?—S. S., Philadelphia, Pa.

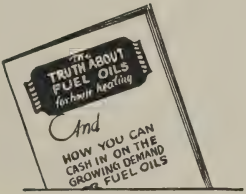
Ans. The book you probably refer to is the Oil Encyclopedia, compiled by Marcel Mitzakis. Copies may be obtained from FUEL OIL'S New York City office for $6 each. Other books of a similar nature are: Handbook of Petroleum, Asphalt and Natural Gas, By Roy Cross, $7.50; and the Handbook of Industrial Oil Engineering, by John Rome Battle, $10. These two, besides the technical dictionary, contain a large store of specific information about oils and the oil industry.

Q. In your December issue, page 82, you have an article regarding cost saving by burning fuel oil on the "S. S. Leviathan." Will you please tell us from what source that information was secured?—N. J. W., Chicago, Ill.

Ans. It was obtained during a personal interview with an official of the United States Shipping Board who is in charge

"The Truth About FUEL OIL for House Heating"

—An Empire Contribution
To a Growing Industry


The TRUTH ABOUT FUEL OILS
for house heating
And
HOW YOU CAN CASH IN ON THE GROWING DEMAND FOR FUEL OILS

After having made a wide investigation of the domestic, house-heating market for fuel oil, we have published our conclusions in a handy little booklet entitled, "The Truth About Fuel Oil for House Heating."

This little booklet is already in its second edition and has created a great deal of interest among oil men and burner men all over this country and in many other parts of the world.

You are invited to write our Tulsa office for a copy now. There's no obligation.

CITIES SERVICE OILS

ONCE-ALWAYS

EMPIRE REFINERIES, Inc.

Subsidiary Cities Service Co.,

General Offices, Tulsa, Oklahoma

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St. Paul, Atlanta, New Orleans, Kansas City,
St. Louis Ft. Worth

of all oil burning installations and all fuel conservation work on Shipping Board vessels, of which the "Leviathan" is one. The article is authentic and contains only the facts as this gentleman gave them to us.

Q. In some instances where we install our natural draft burner, particularly in hot air furnaces, we have a severe vibration or rumbling noise when the maximum amount of oil is turned on. This rumbling, however, stops when the door is opened slightly. Can you tell us what causes this? Also, have you any figures available on the cost of oil burning as compared to the costs of coal burning?—A. W. L., St. Louis, Mo.

Ans. There is much diversity of opinion on the cause of the rumbling noise or panting that is encountered in some oil burners. Some of the theories follow: That the oil is being preheated to too high a temperature, thus causing premature explosions; that it is not being heated enough; and that the air supply is not adequate. This latter seems the most plausible in your case, since you state that the noise stops when you open the door of the furnace, which naturally lets more air into the combustion chamber. It is a strange fact that no one seems to understand this particular phase of oil burning entirely.

C. C. Brierly, writing on this topic in a recent issue of **Fuel Oil,** was of the opinion that panting is caused when "a temporary vacuum is produced and the lack of air is suddenly replaced by a rush of it, only to be supplanted again by the rarified condition; this intermittent action taking place indefinitely. The combustion is most efficient when the flame propagation nearly or exactly balances the incoming air."

You will probably find that if you enlarge the air intake and draft on the furnaces in question or, use some other means of increasing the supply of air to the point of combustion, much of the noise will be eliminated. In the average warm air furnace, any noise is echoed and probably magnified.

Specific information as to the relative costs of oil and coal is a difficult thing to give. Articles in numerous back issues of the magazine, particularly the November, 1923, issue, which contained one written by Leod D. Becker, make comparisons.

We have decided, however, that it is almost futile to try to work out a standard for comparing coal and oil fuel costs. The prices of each and the different qualities encountered in different parts of the country make it impossible to find a common denominator. Moreover, oil burner prices and installation costs vary greatly, as does the upkeep expense. And in most cases, the purchaser is buying convenience, comfort and cleanliness, upon which there is

Improved Rotary Type 22

This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—And Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

Main Office and Factory

S. T. Johnson Co., Oakland, Calif.

Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Paterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.

Write For

Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.

THE BASEL TYPE E-3 HEAT REGULATOR

is now equipped complete, with Thermostat, magnetic control, mercoid switch for operating motor, valve, automatic cut-off, of both oil and motor from overflow of oil to trip bucket, Thermostat control and automatic cut-off each being independent of the other.

Hand control independent of either the Thermostatic control or automatic cut-off.

Removable strainer, air seal, enclosed in steel case.

In fact everything in a nut shell. What more do you want? For Mechanical or Gravity Feed burners.

Basel line of valves and heat regulators are made in seven types. Two of which are approved and listed as standard by the Underwriters Laboratories of the National Board of Fire Underwriters.

All frictionless and packingless.

The Basel line of valves and heat regulators are not just ordinary valves. They mean advanced theories in Heat Regulators and Valves and Valve control construction.

Valves and valve control is our hobby. Literature on request.

911 Mulberry St. **BASEL MANUFACTURING COMPANY** Kansas City, Mo.

A Standard Size for Every Oil Burner

Known Everywhere for Their Quality

MANUFACTURERS OF
OIL EQUIPMENT

Sharpsville Boiler Works Co.
SHARPSVILLE, - - - PENNA.

Books

of special significance to anyone interested in oil burning.

Burning Liquid Fuel
By William Newton Best
$4.00

A practical treatise on perfect combustion of oils, giving analyses, calorific values and heating temperatures of various gravities with information on design and proper installation of equipment for all classes of service.

Fuel Oil and Steam Engineering
By Robert Sibley and C. H. Delany
$5.00

An unusually complete treatment of fuel oil, for the central station man, the power plant operator, the mechanical engineer and the student.

Oil Fuel for Steam Boilers
By Rufus T. Strohm
$2.00

Describing the principles that underlie the use of oil as a fuel in steam boiler practise; the form and action of various types of burners; arrangement of furnaces for burning oil under different kinds of boilers; the operation of accessories such as pumps, heaters and cleaning devices; the methods of storing oil.

Industrial Uses of Fuel Oil
By F. B. Dunn
$3.00

Practical exposition of the use of fuel oil for industrial purposes, giving much specific information gotten through first hand experience.

Liquid Fuel and Its Apparatus
By William H. Booth
$4.00

Descriptions of various systems and apparatus; information on petroleum production and handling; and explanations of combustion principles and theories.

Prompt Attention Is Given to All Orders.

Check should accompany order.

FUEL OIL
for Heat and Power
350 Madison Ave. New York City

no price—no set value.

If you know the B.t.u. content of the oil and coal sold in your locality and the thermal efficiencies of the different furnaces and boilers, you can work out a table based on the one published in the November, 1923 issue of **Fuel Oil,** for comparing the two.

Editor, FUEL OIL:

The list of burners approved by the Underwriters' Laboratories which was published in the Consulting Department in your November, 1924, issue, was incomplete, inasmuch as it did not contain the Hart Oil Burner, Type "C," manufactured by the Hart Oil Burner Company, Peoria, Ill., which was approved by the Laboratories on September 23, 1924.—P. D. V., Peoria, Ill.

The list referred to above was identical with the list published by the laboratories in July of 1924, which was the most recent list published until the revised one was issued on December 10, 1924. A copy of the new list, complete to its publication date, appears elsewhere in this issue.

Q. What is the average B. t. u. content of 24-26, and 30-32 Baume gravity fuel oil, and 32-36 Baume gravity gas oil? S. & M., Stoughton, Wis.

Ans. The following ratio is customarily accepted, although there will, of course, be some slight variation dependent upon the circumstances under which the oil is burned, the section in which it is produced, etc.:

Degree Baume	B.t.u.'s per gallon
24-26	144,900
30-32	141,200
32-36	139,450

North American Company Issues Folder

North American Low Pressure Oil Burners is the subject of a folder issued recently by the North American Manufacturing Company, Cleveland, Ohio. This burner, one of the power type, requires but 5 or 6 ounces of air pressure for efficient operation, according to the folder, and but 5 to 25 pounds of oil pressure. Eight different sizes of the one type of burner are manufactured by this company.

What are you doing?

to satisfy the demand

Every day the question of oil burner ignition and control becomes a more pertinent one. Your consumers the country over have been educated to its full advantage. Automatic regulation is not viewed as an extra "frill" but as a convenience which every purchaser expects.

Jefferson Electric Ignition and Control for oil burners assures the highest degree of safety. It eliminates the possibility of oil or pilot gas accumulating and provides ample power for thermostatic and relay mechanism. It makes possible extending your sales to all territories irrespective of gas supply.

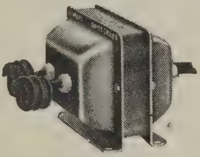
The fact that Jefferson equipment has been adopted as standard by many of the leading manufacturers of oil burners indicates its superiority.

Our engineers will gladly cooperate with you in adapting our equipment to your needs. A list of manufacturers using Jefferson Equipment will be sent upon request.

Write us today.

Jefferson Electric Mfg. Co.

434 S. Green St., Chicago



Manufacturers of:

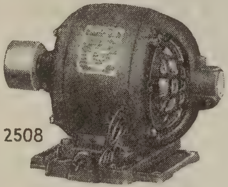
- Radio Transformers
- Bell Ringing Transformers
- Signal Transformers
- Sign Lighting Transformers
- Automobile Ignition Coils
- Jump Spark—Make and Break Coils
- Auto Transformers
- Testing Instruments
- Toy Transformers
- Furnace and Oil Burner Transformers
- Oil Burner Ignition Coils

Jefferson Electric

Ignition and Control

Emerson Motors

Single Phase, Polyphase and D. C.
(Interchangeable)



2 H. P. and Smaller

For thirty years we have specialized in producing motors in these sizes

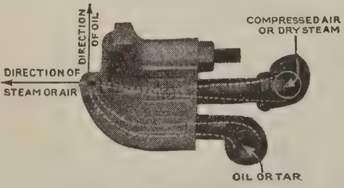
The Emerson Electric Mfg. Co.

2018 Washington Ave., St. Louis, Mo.
50 Church St., New York City

(We sell no motors at retail or to the user)

W. N. BEST

Oil Burners



The BEST since 1890

W. N. BEST Corporation
11 Broadway New York City

FUNDAMENTAL FACTS CONCERNING THE PETROLEUM INDUSTRY

(Continued from page 25)

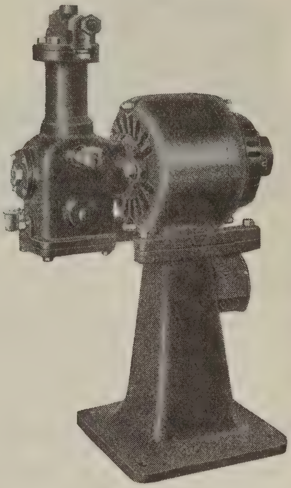
diture of this amount. I finally said, "Well, gentlemen, I simply cannot comprehend your viewpoint. I sit here and make a statement that we can get a billion dollars more per year for our products than we are now collecting, and while nobody disputes this figure, nevertheless, you are unwilling to appropriate $100,000 to start this work." One of our very prominent members said he did not believe we could get any such increased revenue. I replied to him that the figures I presented were not a mere guess but a careful estimate made by skilled fuel engineers but that I could not take up the time of the meeting to convince him of the accuracy of the figures but asked him how much he felt we could secure. He stated that he had concluded after considerable thought that it was reasonable to believe that we could get a cent a gallon more on all of our heavy products. After making a hasty calculation on the table cloth I said, "Well, this would mean an increased revenue of $200,000,000 per year and it seems to me that would be ample warrant for the initiation of a campaign costing $100,000."

In spite of every argument I could make I could not make my associates see the wisdom of appropriating $100,000 and they finally appropriated $25,000, largely, as one of them said, "as a personal compliment to me."

Insures Fuel As Required

Entirely Automatic, No Priming Necessary At Any Time, Easily Installed, Noiseless, Low Cost Operation

Write for Bulletin "H"



Monroe Machine Tool Company
737 W. Jackson Blvd.
CHICAGO

Safety First!

The shivery temperatures are here and they present a dangerous problem if your fuel oil contains too much water. Besides lowering the heat content of the oil, the water is quite apt to form a layer of ice on the bottom of the tank that may spread the seams, clog the pipes and the pump. A burner out of commission now-a-days is certainly uncomfortable. Better be safe than sorry. Send today for the

Oil News Water Detector

It is a weighted brass rule upon which is fastened special detector paper. The rule is lowered into the tank, to the bottom, and the paper, which changes color when it strikes water, indicates the depth of the water there.

Price $1.00

Supply of detector paper sent with each detector.

FUEL OIL
For Heat and Power
350 Madison Avenue New York City

Quick Delivery
of
Kaustine Duplex Oil Burner Storage Tanks

Each tank equipped with quantity gauges. Will go through any basement door. Capacity Storage Tank 200 gallons. Capacity Gravity Tank 60 gallons.

Write or wire for prices.

KAUSTINE CO., INC.
BUFFALO, N. Y.
Mfrs. of all kinds of Fuel Oil Burner Tanks

Permanent Satisfactory Service

That is another one of the reasons why Chalmers Oil Burners enjoy the popularity they do today.

Every feature built up from standardized units, and backed up by our guarantee, Chalmers Oil Burners have earned a reputation that no amount of money could buy.

To become affiliated with this organization as a Chalmers Agent, offers a substantial profitable proposition to the right man.

Correspondence with substantial parties looking to permanent affiliations is solicited.

Chalmers Oil Burner Co.
Minneapolis :: Minnesota
Member of American Association of Oil Burner Manufacturers

I have listened very attentively to the suggestions that my associates have made as to how to better conditions in the oil business. It may be offensive for me to say that it is surprising how few suggestions have been made and all of them to my mind were nothing more than an effort to doctor symptoms. If your child had scarlet fever and you called in a physician you would not feel satisfied is he said the child's face seems to be somewhat red and that he would suggest you buy a can of talcum powder and powder the child's face.

Recommended Program

I closed my address delivered before the National Petroleum Association as follows:

"The Program I Recommend is this:

1st. That we make such changes in the basic methods of producing crude oil that the raw product will not have to be forced upon the market in excess of what the market can absorb.

2nd. That we stimulate every oil company to develop as far as possible the utilization of oil; and to secure the widest possible application for every use which is developed.

3rd. That we give support, encouragement and assistance to inventors and manufacturers of oil burning apparatus.

4th. That the industry as a whole shall cooperate to develop such uses for oil as the individual companies for competitive reasons are not warranted in doing."

"THE FUELITER"

The New Electrical Ignition System for Low Gravity Fuel Oils.

No Oil Burner is at its Best without this up-to-date scientifically constructed system.

Modern conditions demand electrical ignition.

"The Fueliter" was designed by an ignition engineer, who has made some marked improvements in automotive ignition.

"The Fueliter" is fool-proof, safe, economical and positive in action.

Oil Burners equipped with "The Fueliter" have a distinct advantage over anything else now in use.

We will be pleased to show how "The Fueliter" will make a decided improvement on any make of oil burner.

Manufactured exclusively by

VOGE ELECTRIC CO.

1610 S. Michigan Avenue Chicago

Says Huge Store of Oil Exists in Shale

Eight times as much oil as all the wells of the United States have ever produced or are ever likely to produce is stored up in a single deposit of shale in the Uintah Mountains, according to a speech by Dr. David T. Day, formerly petroleum expert for the Bureau of Mines, before the Round Table Club of St. Louis. The trouble is not to find the shale, Dr. Day says, but to get the oil out.

"If we could look behind the closed doors of most large oil refineries," he said, "we would be surprised at the large amount of experimental work in progress for the development of processes for the treatment of oil shales. That does not imply, however, that satisfactory processes do not already exist. There are two processes available and in commercial use at the present time. A plant of either system can be erected in the time required to drill the average California oil well, and the cost of a plant to produce 400 barrels of oil per day does not exceed the cost of drilling a well."

Burner Dealers' Association Formed in Cleveland

Oil burner dealers in and near Cleveland, Ohio, recently formed an Oil Burner Dealers' Association of Cleveland, with the primary purpose of "encouraging the establishment of higher standards of design and quality in oil burners and the servicing thereof." Officers of the new association are: M. G. Limbach, Huger-Limbach Company, president; George Beck, Corporation Sales Company, vice-president; W. C. Voss, Cleveland Oil-O-Matic Company, secretary; Leroy Hulet, Simplex burner distributor, treasurer. These officers and E. H. Frawley, Heat and Power Engineering Company, constitute the board of directors. It is planned to hold meetings every two weeks.

Pressure Tank For Oil Burners Patented

A hydraulic oil pressure tank designed primarily for gravity oil burners has been patented by W. and A. Arntzen of Escanaba, Mich. The invention consists of a small tank with two compartments the larger compartment being the hydraulic pressure tank, and the smaller compartment being the fuel oil displacement tank.

By using this device oil can be supplied under pressure of 25 to 45 pounds to the burner and a heavier grade of fuel oil can be used. By utilizing a spraying device a considerable saving can be effected in fuel and better combustion could also be obtained, it is claimed by the inventors.

The hydraulic pressure compartment is automatically controlled by a float and slide valve. The device functions on the mechanical principle of automatically compressing the oil, by water, through the medium of air.

It has been estimated that to feed oil at the rate of two gallons per hour to a burner at 3 lbs. pressure by air, only .00005 of a horse power is required, an amount too small for an ordinary meter to register.

Gill

AUTOMATIC

Oil Burner

Sheer merit is the basic reason why heating engineers strongly recommend the Gill Automatic Oil Burner and why the Gill distributorship is most profitable.

Simple in construction—positive in operation, Gill Automatic Oil Burners give complete satisfaction.

You do not have to spend your profits servicing a Gill Burner.

Gill Manufacturing Co.
8300 South Chicago Ave.
Chicago, Illinois

Write for details of our selling franchise

Saving Them?

WHEN a magazine champions a cause as aggressively and intelligently as FUEL OIL champions the cause of efficient oil burning and of the oil burner industry, each issue of that magazine is certain to be filled with new, interesting and vital information that the efficient and far-seeing member of the industry, as well as each individual owner of oil burning equipment, will save and file for future reference.

But a pile of copies on the corner of the desk is not a very efficient file, and even when they are placed on shelves they are liable to be damaged. So we have provided a safe way to save them with the

FUEL OIL BINDER

It is substantially finished in heavy black cloth and leather and is lettered in gold. It holds from one to twelve copies of the magazine and is made to easily permit the addition of a new copy each month. We offer it at cost—$1.40—check to accompany order.

The value of copies of FUEL OIL mounts rapidly with age. Be sure you save yours. A check in the mail today makes it an easy process.

FUEL OIL

For Heat and Power

350 Madison Avenue
New York, N. Y.

20 East Jackson Blvd.
Chicago, Ill.

Fuel Oil Markets

Fuel Oil Prices Higher—Distillates in Good Demand

FOR the thirty days prior to this writing the fuel oil market has been motivized by strength in prices, leading to material increases. Indications point to continued firmness and possibly to slight additional increase for at least another month on heavy fuels. Lighter burning oils are just swinging into the season of acute demand and may be expected to go higher than present levels.

New Field Opened

In the week just preceding this, the fuel oil market has not seen so precipitate an advance as it experienced for some weeks. There is no doubt the market reached a point where some users began to use the threat of returning to coal as a psychological bludgeon on the market. Moreover, a new Texas field was opening up with chances for some sensationally large production and this had an advance psychological effect before exerting any actual force market-wise.

While the apparition of a return to coal by large fuel users is called up to help in shading buying prices, the fulfillment of this threat is not expected by market authorities to bring any considerable influence to bear upon the situation unless fuel oil prices go much higher. There are the factors of efficiency and handling which do not show up there. It is an open secret that many, many industrial users of fuel oil would not consider returning to coal at anything like present oil prices.

Slight Fuel Shortage

Reports from Group 3 refineries were of an actual shortage of fuel oil available for sale around the middle of the month. There has been little if any let-up in consumption. For the year 1924, the fuel oil consumption will show marked increase over that of 1923. The output also will be larger. Among the principal large buyers of fuel oil the past month have been railroads and some of the marine shipping corporations. One Texas refiner reported an unusually large amount of fuel oil moving to Atlantic Seaboard points around the middle of the month. An important factor in December fuel oil buying has been the open market dealings. Panuco crude was selling at Tampico around $1.25 a barrel ex-tax f.o.b. steamer, which, delivered to Gulf Coast ports, means $1.60. However, there was little available, producers holding the oil for their own purposes.

KELLOGG COMPRESSORS

Air Compressors.
Vacuum Pumps.
Special Oil Burning Equipment

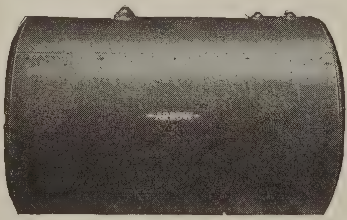
Our engineering and production departments are at your service in increasing your output of Oil Burners.

Send Direct

KELLOGG MANUFACTURING COMPANY

Rochester, New York

ARROW
Unconditionally *Guaranteed* Oil Storage Tanks



The Novelty Steam Boiler Works Co.
929 S. Howard St. BALTIMORE, MD.

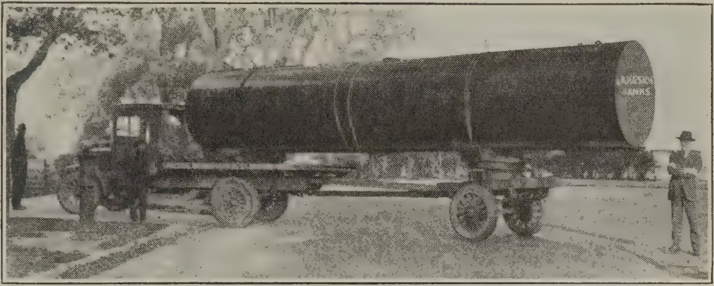
Gas oil recently has felt an increased demand after a somewhat draggy time of it. It is generally believed that its price will about hold its own at around 3¼ cents, or possibly 3½ cents for the cold weather. It is being sold now mostly in small lots. In some cases it is blended to make desired specifications.

Distillates are looking up, as a quite natural response to the first severe and widespread cold wave of the winter over a considerable portion of the United States. Oil burner sales are being made to householders at unprecedented rates. There still is uncalled for discrepancy between the activities of the oil industry and some of the burner interests as concerns information on and adjustment to suitable grades of fuel. Kerosene is running about steady.

Tank Car Prices

The following prices are for tank car lots, f.o.b. Group Three refineries or adjusted to that basis, shipment in sellers' tanks, as of December 19:

Fuel oil, 24-26 gravity, per barrel....	$1.17½	1.22½
Fuel oil, 26-28 gravity, per barrel....	—	1.25
Fuel oil, Smackover, per barrel	—	1.15
Gas oil, 32-36 gravity, per gal.......	.03⅛	.03¼
Distillate, 36-38 gravity, per gal.......	.03½	.03⅝
Distillate, 38-40 gravity, per gal.......	.03⅝	.03⅞
Kerosene, 41-43 gravity, per gal.......	.04⅜	.04⅝
Kerosene, 42-44 gravity, per gal.......	.04½	.04¾



Specify

Lakeside Tanks

Guaranteed not to leak

Welded with the Electric Arc Process. Made in all sizes from 60 to 24,000 gallon capacity. Popular sizes are carried in stock for immediate delivery.

Lakeside Tanks are approved and labeled by the Underwriters Laboratories.

Write for literature and prices
Let us quote you on your requirements

Lakeside Bridge & Steel Company
North Milwaukee, Wisconsin

Chicago Distributor

American Tank and Installation Company
1320 Burnham Building, 160 N. La Salle Street
Phones: Central 6841, Sheldrake 3544

New-Type Oil Burner Proved for Six Years

Six years ago the first Oil-O-MATIC Oil Burner was made. Nearly 20,000 are now in use and every user is satisfied.. Burns cheapest fuel oil. No continuous pilot light. No part inside furnace or boiler. No gears. Moving parts run in oil. Tested and listed as standard by Underwriters' Laboratories. One of the fastest selling oil burners on the market. New deferred payment plan doubling sales for present dealers.

A few territories still open to men who can qualify. Write today for full information.

Williams Oilomatic Heating Corp.
Main Office and Plant
BLOOMINGTON, ILL.
Branches in all leading cities.

WILLIAMS
OIL-O-MATIC
HEATING

STEAM IS BEST MEDIUM FOR PREHEATING FUEL OIL

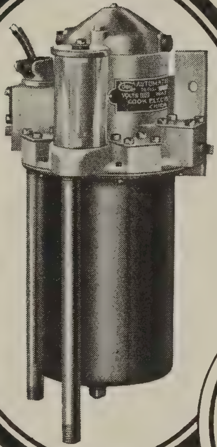
(Continued from page 10)

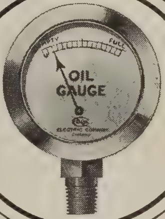
its use has advantages over other methods, chief among them being its availability in large quantity and its low cost. There are many variations of specific ways to heat the oil by steam. In one type, the oil is run through pipe which is surrounded by the heating apparatus, the shell. In another the oil is heated in tanks by running steam coils through it. This is the more common practice, although the former has advantages in large quantity heating. Heating with the steam coil in tanks is generally satisfactory because the heating agent is easy to control.

Continuous Coil Best

It is preferable that the heating coil be continuous. This, although easily accomplished where the service tank is concerned, presents problems when applied to the storage tank because the latter usually is of generous proportions. The reason for suggesting the continuous coil is that, with the perversity of all things intended to remain tight, the joints have a tendency to blow out at inopportune moments unless strongly reinforced.

In heating comparatively high gravity coils, spent steam may be used, but if the rate of oil flow is large and the fuel oil is of low gravity, it probably will be necessary to turn quantities of live steam into the heating apparatus to accomplish results. Where waste steam is used and a boiler is installed for heating





Cook Pumps & Gauges

Cook Pump

The pump automatically delivers oil to the burner only at such time and in such quantities as the burner requires the oil. There is never more than a gallon of oil in the basement at any time. Cook pumps are reasonable in price, economical to operate, noiseless and entirely automatic.

The Cook Oil pump is a bellows type pump. It contains no packing. It is positive and reliable in its operation. It is easily installed, noiseless and operates at a cost for current of less than 20 cents per 1,000 gallons.

Cook Gauge

The Cook Hydrostatic gauge for buried oil-tanks measures the quantity of the oil in either an inside or outside tank. It is operated by the pressure of the liquid on the diaphragms. This pressure is transmitted by a liquid in the small copper tube to the indicating gauge. To install, drop the operating diaphragms to the bottom of the tank through the 2-inch pipe hole. Insert the 2-inch reducing bushing that is threaded on the transmission tube and screw down the packing nut. The gauge mounts 2 feet above the storage tank any place within the length of the copper tube. This hydrostatic gauge is strongly built, compact, accurate, and easily installed.

Folder fully illustrated upon request.

Cook Electric Company

2700 Southport Ave. Chicago, Ill.

purposes, steam is economical, but when starting up cold it is necessary either to have a connection from some other source or to start on light oil and run until steam is raised on the waste steam unit. This introduces complications.

Construction of oil heaters using steam usually is of wrought iron or steel pipe, or small size seamless steel tubing. The importance of eliminating shutdowns in boilers using fuel oil is such that many concerns employ two pre-heating units, one in use and the other as a spare to be used when the other is overhauled.

Electricity a Doubtful Medium

Electricity may be regarded as a rather doubtful medium for heating fuel oil. To date it has been impossible to overcome completely some of its disadvantages. Using it, a coil system may be designed not to exceed a certain temperature when it is new, but after it has been in operation users have found the resistance to current increasing, with correspondent increase in temperature and obviously objectionable consequences. The increasing resistance is due to wearing away and decomposition and a consequent decrease in a cross-section of the area of the wire. Deterioration of electric coils is further accelerated if the oil contains a trace of acid, which often is the case. Aside from this, electricity is considered rather expensive for this use.

Diesel oil engine users have found a highly economical method of preheating their fuel oil by tapping the exhaust system and diverting quantities of the exhaust gas into apparatus brought into intimate contact with the oil. Wherever the exhaust of internal combustion engines is available it may be regarded as a good medium for pre-heating fuel oil.

Fuel Oil Contracts Average $1.75 per Barrel

Awards of contracts to two companies for furnishing the fuel oil requirements for U. S. Shipping Board vessels at Atlantic and Gulf Ports during the calendar year 1925 were made by the Emergency Fleet Corporation on December 17 as follows:

Standard Oil Company (New Jersey), New York, 4,200,000 barrels—terminal, $1.79 per barrel; barge, $1.85½. Baltimore, 960,000 per barrel; barge, $1.85½. Charleston, 180,000 barrels—terminal, $1.74.

Mexican Petroleum Company, New York City. Jacksonville, 198,000 barrels—terminal, $1.70; barge, $1.76½. Houston, 198,000 barrels—terminal, $1.50.

New Blackmer Plant to be Completed February 1

According to a recent announcement, the new plant that is being built by the Blackmer Rotary Pump Company in Grand Rapids, Mich., will be ready for occupancy by February 1, 1925. The new plant, which will represent an investment of about $325,000 when complete, will triple the production capacity of the company, officials say. The present plant, located at Petoskey, Mich., producss three thousand pumps monthly.

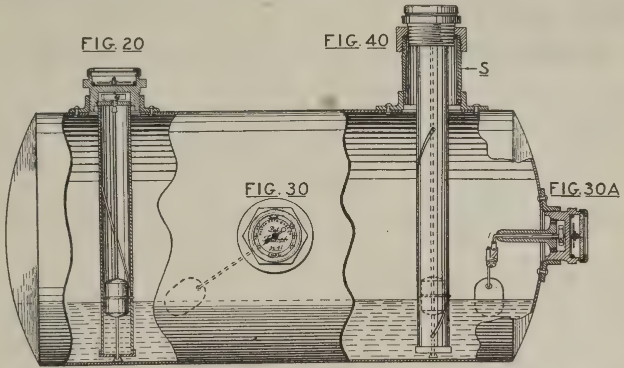


Fig. 20. Triumph No. 26 O. B. Upright gage, shown in section.

Fig. 30. Triumph Jr., No. 41 gage, applied to side of tank.

Fig. 40. Adaption of Triumph No. 26 O. B. gage for storage tanks buried underground.

Fig. 30A, Triumph Jr., No. 41 gage shown in section, applied to dome end of tank.

"*Triumph*"

Magnetic Oil Tank Gages

are

Durable -- Dependable -- Safe

The indicating pointer on all models of the "Triumph" is a compass needle which is revolved by the turning of a magnet under a solid diaphragm. This makes the gage absolutely safe for use below the level of the fluid, for even if the glass becomes broken there is no opportunity for either the fluid or fumes to escape.

An actual test by the Underwriters' Laboratories showed that a pressure of 1500 *pounds was necessary to cause a rupture of the diaphragm.*

Eighteen years of gage manufacturing experience have gone into the perfection of this gage.

Write for details of Model Jr. No. 41 and Model 26 O.B. which are special designs for oil burning equipment and are listed as standard by the Underwriters' Laboratories.

Boston Auto Gage Company
248 Boylston Street **Boston, Mass.**

YOUR CONTROL PROBLEMS

Solved and Service Calls Eliminated by Dependable, Long-Lived

CON-TAC-TOR **Mercury Controls**

High and Low Voltage Room Thermo Switches, Boiler Safeties, Time Limit Switches, Magnetic Valves, etc. A complete Automatic Line.

ABSOLUTE CON-TAC-TOR CORPORATION
BELOIT, WISCONSIN

WEBER BROS. METAL WORKS
Oil B Dept.
108 N. Jefferson St. Chicago, Ill.

Are equipped to make to your specifications metal floats, trip buckets, special sheet metal work, stamping and machine products.

Let us figure with you

PETROMETER
Fuel Oil Gauges
Are adaptable to all Tanks
Price, $5.00 to $20.00
Porter Electric Carburetor Company, Inc.
Manufacturers of Gauges
35 Purvis St. Long Island City, N.Y.

BURNING OIL EFFICIENTLY IN THE SCOTCH BOILER

(Continued from page 10)

properly for good combustion. This is also true if the rings are broken, making them uneven and allowing air to leak by without properly mixing, thereby increasing the stack losses and lowering the efficiency considerably. These conditions also cause a smoking burner. If more air is supplied the smoke may stop, but the stack losses will increase.

It has been found that a definite size combustion ring should have a definite size flame cone. This does not apply to all mechanical burners, but chiefly those of the Coen and Dahl types. The Coen uses a 12 inch cone with a 16 inch diameter opening in the ring. With unusual draft conditions a 17 inch cone is placed back of the larger one. This has eliminated considerable trouble where the flame had a tendency to leave the tip. A 13 inch flame cone is used for the same size opening in the ring for the Dahl system. The slight increase in size does not affect the conditions because the design is a little different.

The burner ring adopted by the Shipping Board for these installations is of the "V" shaped, periphery type which has been found to give the intimate mixture of atomized oil with the entering air that is necessary for complete combustion, and the cone of oil can be easily brought to an approximate point of tangency. With this type of burner ring the incoming air is directed at right angles with the proper burner setting. The ring

Every Graver Tank is Pressure-tested

Save One Half the Freight on Welded Tanks

Freight charges on tanks in less than carload lots are, in nearly every case, twice the rates on carload shipments. And it only takes from 10 to 14 tanks for a carload.

In addition to the more favorable carload freight rate the unusually low price for single tanks is even bettered on carload lots.

Lap welded joints, flanged inverted heads and the use of only "Class A Structural Quality Steel" gives each Graver tank a durability that withstands the hardest usage. Each one has the Underwriters' Label.

Send a list of your requirements on a quantity basis for these tanks of 550 to 5,000 gallons capacity.

The low freight rate and price of tank will surprise you.

GRAVER *Corporation*

(WM. GRAVER TANK WORKS - FOUNDED 1857)

Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment

160 Todd Avenue, East Chicago, Ind.
New York Chicago Tulsa Houston

Sun Oil Burner

Experienced fuel oil dealers prefer the SUN because they can supply it both for low priced natural draft installation and when completely automatic power burner is required. It offers them more practical and proved selling points and is efficient and economical. Write for particulars.

Heat Equipment Corp.
134 So. 13th St. Lincoln, Nebr.

John C. Hornung
Consulting Engineer
25 Years Experience in Combustion and Control
343 So. Dearborn St.
Chicago

Aeroil Burner Co., Inc.
Union Hill, N. J.
Manufacturers of
Kerosene Thawing Outfits
Flame Concrete Heaters
Portable Water Heaters
"Smokeless" Asphalt Kettles
Portable Oil Burners and Torches
Lead Melting Furnaces
AGENTS WANTED

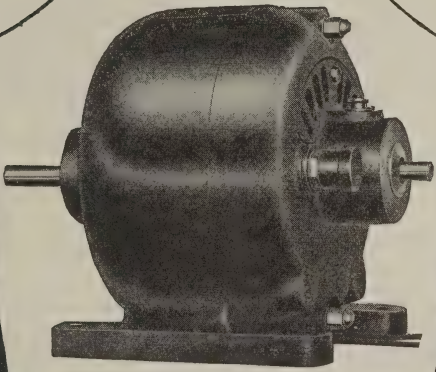
when installed should be set in such a location that the burner will be at mid-position of adjustment. This is done by placing the burner in the mid-position and placing a 70-degree template at the burner tip so the template will just clear the "V" shaped opening.

In order that the burner can be adjusted to take care of varying capacities with the changing of tips and draft conditions, a flexible hose is connected between the oil service line and the yoke of the burner. A valve should be placed at each end of the hose. This allows the firemen to handle the burner easier and permits the hose to be taken off without interfering with other fires.

Too much stress cannot be placed on proper burner rings and burner adjustment for they are in the first group of most important details which make for highest Scotch boiler efficiency.

Catalog Gives Information on Pumping Equipment

Information on the M-D-Co. pumping equipment for the oil burner industry is given in Catalog A, recently released by the Mechanical Devices Company, Aurora, Ill. This equipment includes both hand and motor driven rotary pumps, with accessories for each. Interesting tables showing the loss in head due to pipe friction in various sizes of pipe and per gallons of water handled per minute; another for converting pressure per square inch into feet head of water; and one for converting inches of vacuum into feet suction are also given in the catalog.



Special Motor Developed for a
Manufacturer of Oil Burners

WE are not so self-confident to call our product a master piece, because of the extreme accuracy or mechanical perfections that each and every motor has. We would rather that you be the judge. Tell us some of the particulars of your product and let us send you a motor subject to your approval.

Janette Manufacturing Company
556-558 West Monroe Street
Chicago

PHILADELPHIA
439 REAL ESTATE
TRUST BUILDING

NEW YORK
SINGER BUILDING
149 BROADWAY

Oil Burner Exhibits Receive Much Attention at Power Show

By E. L. Fowler

MORE than 75,000 persons visited the Third National Exposition of Power and Mechanical Engineering, held in the Grand Central Palace, New York City, December 1 to 6. Over 380 exhibits filled the first two floors and part of the third floor of the palace, covering the range of power and mechanical engineering in a very thorough manner.

Mostly Combustion Equipment

By far the largest portion of the Exposition was devoted to combustion equipment, practically every known type of combustion device being shown. A number of oil burner firms had exhibits ranging from one to several burners, some set up and in operation. The burner manufacturers having exhibits included the Bethlehem Shipbuilding Corporation, which showed the Bethlehem-Dahl burner; Coen Company, which showed the Coen burner; Engineer Company, which showed the En-Co burner; Morse Dry Dock & Repair Company; and the Preferred Utilities Company, which showed the Ray oil burner. Most of these were of the industrial type and received a great deal of attention, large crowds being gathered around the booths at all times.

Several unique methods of mounting burners for exhibition were in use, a particularly good one being that employed by the Morse Company whose burner was attached to one end of a large, horizontal glass cylinder so that when oil or water was forced through the burner, its condition immediately after leaving the nozzle, the path followed by the spray and the degree of atomization reached were easily apparent to the spectator who stood beside the cylinder.

Refractory Firms Represented

About 25 refractory and fire brick manufacturers had exhibited booths, as well as a number of temperature control and heat regulating and testing equipment. Among these later were: Uehling Instrument Company Federal Gauge Company, C. J. Tagliabue Manufacturing Company, Fulton Company, and the Brown Instrument Company. Several manufacturers of water softeners, including the Wayne Tank and Pump Company and the Permutit Company and practically every large boiler firm in the country were also represented.

A program of lectures and motion speakers was arranged by the Advisory Board for each day during the show and the National Museum of Engineering and Industry had a large display of pictures, models and original drawings of a great historical value.

A new booklet describing Sylphon bellows has been brought out by the Fulton Company, Knoxville, Tenn.

GOULDS

Hand Rotary Pump for Fuel Oil Systems

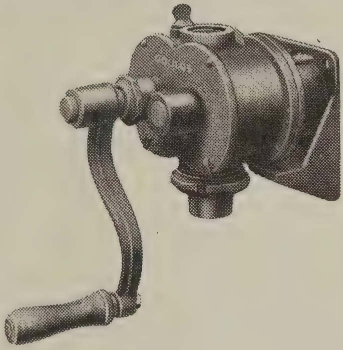


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings.

Furnished with bracket for attaching pump to side wall. This is a big improvement over the type that depends on pipes for support. Can be furnished without brackets if desired.

Capacity—10 gallons per minute.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. **Seneca Falls, N. Y.**

Happy New Year to the Trade

We hope business will be as good with you in 1925 as we know ours is going to be.

Every week shows a steady gain in sales and simply proves that our 34 years of manufacturing experience has produced the last word in Oil Burners.

Dealers: The franchise to sell the Hart Oil Burner in the community is valuable. Write for details.

Hart Oil Burner Co. "HART HEAT"

Department 101 **Peoria, Ill.**

NATIONAL
BURNER

Airoil Burners
"are efficient"

The Complete Design
and Installation of
Oil Burning Systems

**National
Airoil Burner Co.
916 Thompson Street
Philadelphia**

WE SPECIALIZE
IN
FUEL OILS
GAS OILS
FOR DOMESTIC OR
INDUSTRIAL PLANTS

DELIVERED EITHER IN
TANK TRUCKS OR
TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

OHIO REFINING COMPANY

TELEPHONE RIDGE 884
CINCINNATI, OHIO

Plans National Oil Burner Supply House

A supply service coordinating all sources of supply for oil burner distributors in installation and service may be established if the plans of certain interests in the burner industry are completed.

The Hebel Oil Heating Engineering Company of Chicago, of which Fred Hebel is the head, is making a preliminary survey of manufacturers and dealers to determine their attitude toward such a plan, which is a well-established feature of modern distribution in other industries. Mr. Hebel wishes to make is possible for burner distributors to obtain all installation and service supplies from one source, at prices comparable with factory prices. He believes this will prove a definite aid to both manufacturers and dealers.

Included in this supply jobbing business as planned would be the cataloguing of various types and grades made by leading manufacturers in various lines and the distributing of the catalogues among burner dealers and distributors in the Middle West.

Everbrite Issues Pamphlet

Pamphlets describing "Heat as Clean as Sunshine" have been issued by the Everbrite Stove Company, Kansas City, Mo. The Radiant Oil Heater, which is manufactured by the Everbrite Company, and which is also described in the pamphlet, is a small portable burner, using kerosene, which may be moved about at will. According to the pamphlet it can be used to heat one room or several.

FUEL OIL
FOR HEAT and POWER

Devoted to developing and encouraging the efficient, scientific use of oil fuels.
Published Monthly

Vol. 4 February, 1925 No. 8

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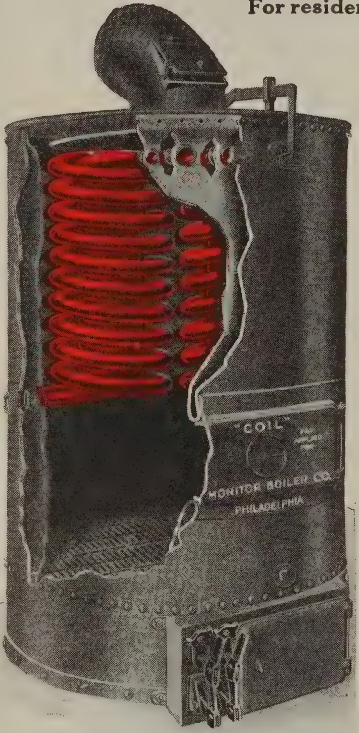

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How We Sell Oil Burners to Coal Dealers

By George P. Kittel *

WHILE this may appear, at first thought, a difficult selling problem, the fact that more than 2,000 coal dealers are now using oil burners of a certain type seems to indicate that it is not so hard after all,—provided you have the right burner. Coal dealers have found portable oil burners to be the best, cheapest and quickest means for thawing out and unloading frozen coal cars, hoppers and coal pockets and thereby considerably reduced the cost of handling coal during the winter months.

Coal is usually shipped from the mines in steel hopper cars, of the gondola type, containing from 30-80 tons of coal, and open at the top. These open cars, while in transit, often encounter severe snow, hail and rain storms, so that the coal becomes completely water-soaked. One night of freezing temperature transforms this wet coal into a solid mass of frozen coal, and when the cars reach him the coal dealer thinks he is in the ice business as well.

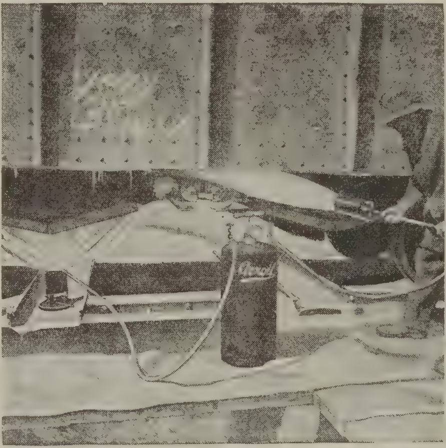
Cars so frozen cannot readily be unloaded, except at great trouble and expense. Some coal dealers build big wood fires under the cars and try to thaw them out that way; a dangerous practice and one that is discouraged or prohibited by their fire insurance companies. Others have a gang of laborers dig the coal out of the car with picks, chisels and sledge hammers. The writer has seen as many as six men work all day, trying to unload a car of frozen coal in this manner. A cheaper way would be to run the frozen cars onto a side track and wait until a warm day comes along and let nature thaw them out. This, however, entails heavy demurrage charges by the railroads and ties up a lot of valuable coal which should be in the bins of the coal dealer's customers to keep his turnover working.

To meet this condition and assist coal dealers to readily unload frozen coal cars, a portable kerosene

---

* President, Aeroil Burner Company.

burner, of special design and construction for outdoor use, was placed on the market about six years ago and has since been adopted by thousands of coal dealers and others, handling coal in car-load lots. This oil burner, or thawing outfit, as it has been named, consists of a ten or fifteen gallon capacity galvanized steel pressure tank, which is equipped with a powerful hand air pump, a pressure gauge, air relief valve, filling cap and two oil needle valves, two 10 foot lengths of special oil resisting flexible hose, one upright, circular flame burner, having a flame-spread of about 36 inches and one torch type burner, having a long flame about 3½ inches in diameter by 36 inches long.



Using an oil burning torch to thaw out a carload of coal, preparatory to unloading.

Both of these burners must be storm and windproof, so that they will operate properly in all kinds of weather. The upright burner is placed directly under the frozen car and may be left alone for several hours without attention. The torch is used for opening the frozen hopper doors, which only takes a few minutes, and for loosening coal which is frozen to the sides of the car. In this manner one man can thaw out a frozen car of coal in from one to two hours.

The thawing torch can also be used in coal yards for removing ice and snow from coal chutes, conveyors, hoppers, screens, scales, platforms, ladders, tracks and switches, in coal mines for opening frozen doors on empties, thawing out frozen tipples, unloading booms, steam, air and water pipes.

In other seasons the torch need not remain idle. It can profitably be used in the repair shop for all heating purposes in connection with straightening bent dumping cars, shafts, axles, truck frames, goose-necks, conveyor buckets, rebabbitting bearings, expanding collars and machine parts, to make shrink-fits, brazing, pre-heating for welding, loosening tight gear wheels and other work of similar nature.

Any tool as useful as this is, therefore, a good investment and even a coal dealer can be persuaded to buy an oil burner, if it is of the right type and disguise by properly calling it a—thawing outfit.

The Effect of Furnace Temperature On Boiler Efficiency

By C. H. Jack

IN present day boiler operation the furnace temperature is, with very few exceptions, not thought of as a means of determining boiler efficiency, although the average experienced engineer or fireman who is operating an oil fired boiler can generally look through the peep-hole with a pair of colored glasses or perhaps through the air register and determine how efficiently he is burning his oil. There are times when these fires are very deceiving, however, and other methods must be resorted to. One of the most common methods of determining how efficiently the air is being admitted to the spraying oil is by means of a gas analysis. There are many machines on the market for this purpose, some being of the recording type, and others that are worked by hand, such as the Orsat.

IN the combustion of oil it is, of course, absolutely necessary to admit an excess of air to the furnace. With efficient furnace management and careful regulation, however, the excess may be kept as low as 10 per cent and plants which operate with an excess under 20 per cent are common. The fundamental reason for the small supply of air required to burn oil lies in the fact that conditions in the oil burning furnace are very favorable to the thorough mixing of the air and the fuel.

In taking gas samples, the pipe should be located so as to get samples of gas which are representative of the entire boiler. In order to get the real meaning from the gas analysis the sample should be taken as near as possible to the combustion chamber or furnace, such as the first pass of a B & W Boiler.

When we get a low CO_2 reading from a gas analysis, the most logical thing to do is to reduce the quantity of entering air to the burner or burners and then proceed with another sample of gas. The CO_2 may have improved slightly the second time and in order to get a high CO_2 numerous samples are taken and adjustment made to air register. If the CO_2 does not exceed a point where CO (unconsumed carbon) is found, the engineer or fireman will be much surprised to note, by taking another look at the fire, that a radical change has come about, and the fire they thought was hot before is much hotter now. Just what has happened and why? The furnace temperature has been increased by reducing the excess air.

(Continued on page 78)

Second Annual A. A. O. B. M. Meet to Be in Chicago

Arrangements are well under way for the second annual meeting of the American Association of Oil Burner Manufacturers, which will be held at the Edgewater Beach Hotel, Chicago, April 1, 2 and 3, according to a recent announcement by Leod D. Becker, executive secretary. Both the meetings and business sessions for members and the exhibits of burners and burner supplies will be held in the same hotel.

Every burner manufacturer, dealer and user in the country, whether an association member or not, is invited, according to Mr. Becker, and a large attendance is expected. Plans are being made for an extensive entertainment for those in attendance, particularly for the wives of the association members, for whom a special program of entertainment will be provided each day of the meeting.

Mr. Becker reports a large number of advance reservations for space in the exhibit hall, both by burner manufacturing firms and burner supply firms. The program of speeches and discussions for the daily meetings has not yet been completed. Much interest was taken in last year's program by those in attendance and it is probable that the same manner of arranging the program will be followed for the forthcoming meeting.

Tulsa Hotel To Burn Oil

The new Hotel Mayo at Tulsa, Okla., a $3,000,000 project, will burn oil as fuel for which purpose one of the largest installations of equipment in the Southwest has been completed. In spite of the fact that Tulsa is in the center of a vast gas field, oil burning equipment is used in practically all the leading buildings and many of the fine homes of the Oil Capitol.

British Fuel Oil Use Steadily Increases

The increase in consumption of fuel oil by British commercial and naval vessels, railroad locomotives and industrial plants has increased greatly during the last year, according to a recent report by the Department of Commerce. During the 12 months ended July 1, 1924, 45 vessels, of 242,162 tons—27 per cent of the tonnage of the new vessels—were fitted for oil burners. At the beginning of July of 1924, British steamers of the aggregate tonnage of 17,154,072 tons were recorded as oil burners, compared with 15,792,418 tons, July 1, 1923, with 9,359,334 tons, July 1, 1920, and with 1,310,209 tons, July 1, 1914. Many large business and office buildings in London have very recently installed oil burning heating plants. Of necessity, the fuel imports have kept pace with the demand, the refineries in England falling far short of meeting the requirements. For the first ten months of 1924, fuel oil imports into England totalled nearly 400,000,000 gallons, a gain of 24,000,000 gallons, or 8 per cent over October, 1923.

The American Radiator Company has announced the preparation of plans for a one-story addition to its Buffalo plant. It will require an expenditure of $50,000.

The Problem of the Oil Burner Manufacturer

By Edward P. Bailey *

IT would be difficult to take an industry of such potential magnitude as the manufacture of oil burners and to state in a few words what might be called "The Problem" of that industry. It is true of the oil burner manufacturer, as of every other manufacturer who pioneers in a new industry, that he has a problem. That problem, however, is complex and many sided and not easily stated.

All of us who manufacture oil burners will doubtless agree that this problem may be divided into two major parts. First, the part of the problem that arises within our own factories and is concerned with manufacturing an oil burner that will serve its purpose satisfactorily and efficiently. Second, the distribution of this oil burner to the householder.

With the first part of this problem perhaps it would be just as well that we should have very little to do today. There are so many different types of oil burners aiming to take advantage of so many different principles of construction, and so many different engineering ideas, that the manufacturing problem is one that is individual to each manufacturer and can probably be best handled and solved by him. We will assuredly have sufficient to engage all the time we can give to the subject, if we confine our discussion to the second part of the problem, the distribution of the burner to the householder.

This part of the problem is many sided and every manufacturer knows from his own experience, that in clearing away one difficulty after another, he finds himself continually facing still another. There are several of these that we may very well consider today with advantage to all concerned.

(1) In the first rank of these we may well place the selection of a

MORE and more attention is being given to oil burning in the meetings of the American Petroleum Institute, which is probably the largest and strongest association in the oil industry. One entire group of speeches and discussions during the recent meeting in Fort Worth was given over to oil burning, with prominent members of both industries on the program. This gradually growing mutual interest is part of the huge step forward that is being taken by both industries.

---

* National Airoil Burner Company. President of the American Association of Oil Burner Manufacturers. From a speech delivered before the recent convention of the American Petroleum Institute.

suitable local distributor in each city where the manufacturer intends to do business. Outside of the comparatively few oil burning machines that the manufacturer may sell in his home territory, his distribution must be made through distributors or agents. These agents must be fairly numerous and well scattered throughout the available territory, and must have certain absolutely essential qualifications. Every manufacturer has found this selection of a suitable local distributor to be a continuing problem in every locality.

Must Have Capital

First he must be reasonably well-to-do financially. He must be able to fit out a suitable place of business and to supply himself with a sufficient number of oil burning machines to enable him to carry on his business expeditiously, without waiting for the factory to supply him after a sale has been made. And he must be able, usually through some finance company, to take care of his customers who desire to pay for their burners on the installment plan. If this were the only qualification, however, the oil burner manufacturer might well be able to find a sufficient number of agents, for the banks always welcome an opportunity to aid in seasonal help to a depositor whose business is seasonal, as is that of the oil burner manufacturer and his agent. There are always, however, a good many business adventurers, the "soldier of fortune" type, generally with some show of assets, waiting to get in on the ground floor of a new industry, but who fall by the wayside with the first show of difficulty. The oil burning industry has already had its share of this type, and every oil burner manufacturer can tell of the disorganization of his business, that has followed in one locality or another, because of the faint-heartedness of a supposedly good agent.

But the financial qualification, while an absolute necessity, is only the beginning. The agent must be one whose previous training has qualified him to understand the general principles of combustion engineering. It would perhaps surprise those who have not had occasion to look into the matter to know how real are the combustion problems that confront the man who undertakes to install oil burning equipment in even the smallest furnace.

He must also be familiar with mechanical apparatus of many kinds, for pumps, motors, blowers, fuses, thermostats and such like become his nightmare as soon as he enters the Oil Burning business.

Sales Ability Necessary

He must also be a first-class sales manager, for the nature of the business requires that he employ salesmen on commission, and the proverbial lawyer has nothing on some of these salesmen. A client asked the Doctor how lawyer Brown was getting along, and the Doctor replied, "Poor fellow, he's lying at death's door." "Well, well," he replied; "that's grit for ye. At death's door and still lying." Perhaps no one thing has directly caused more trouble to the distributing agent of the oil burner manufacturer than

(Continued on page 69)

The Domestic Oil Burner—Past, Present and Future

By C. H. Chalmers, E.E.*

I PRESUME that when anybody begins to think of oil burning in a large way, the first thing they would like to know, and tell if they did know, would be that there are about so many American homes that are now heated with oil. There may be 500,000 such homes. Admitting that it is impossible for anybody to say what the exact number is, I am inclined to think that a half million is a fair estimate. Five years ago very little was known about the domestic oil burner. No intelligent engineer will do otherwise than admit that the past five years have comprised a period of great progress, or would decline to give the oil burner industry credit for doing as well with its first half million machines as the automobile manufacturers did with theirs.

> *"THE year 1925 should mark the beginning of a more hearty cooperation between the oil burner manufacturers and the dealer, on one side, and the oil companies on the other. Cooperation between these industries is absolutely essential to the welfare of both.*
>
> *"The unattended oil burner in the American home is entitled to a clean, uniform product and the oil companies of this country should bring their burning oils for home use to definite grades, just as they have brought their gasolines and their various lubricating oils for the respective uses of each."*

As the industry enters 1925 we should consider the accomplishments we now have, the present status of our industry, and with these two things in mind, see if possible where we are tending in the matter of design and the prospects for a greater volume of business and a reasonable profit for those engaged in the industry.

The first burners to attain any prominence at all were approved by the Underwriters to burn kerosene and such burners, during the last five to seven years, deserve a great deal of credit for their contribution to the industry. A little later kerosene distillates were handled successfully and during the past two years a good many burners have handled with a fair degree of success the various grades of gas oils. It is interesting to comment that no burner for odmestic use has ever been approved by the National Board of Fire Underwriters to use any heavier grade of oil than gasoil. A few burner manufacturers have been attempting to use fuel oil for domestic use, but the National Board of Underwriters state that oil for domestic burners must be a distilled or topped oil.

---

* President, Chalmers Oil Burner Co.

The domestic burner is outstandingly distinguished from the industrial burner by the fact that it is allowed to be operated without an attendant. It would seem that any unattended burner, in order to be safely operated, should have a clean and uniform grade of fuel, and I believe the Underwriters are justified in drawing the line at oils that have been topped or distilled.

So the domestic oil burner industry now stands at a point where it has made good progress in furnishing domestic burners that operate very satisfactorily on such grades of oil as are fit to use in a burner that does not have an operator constantly on the premises.

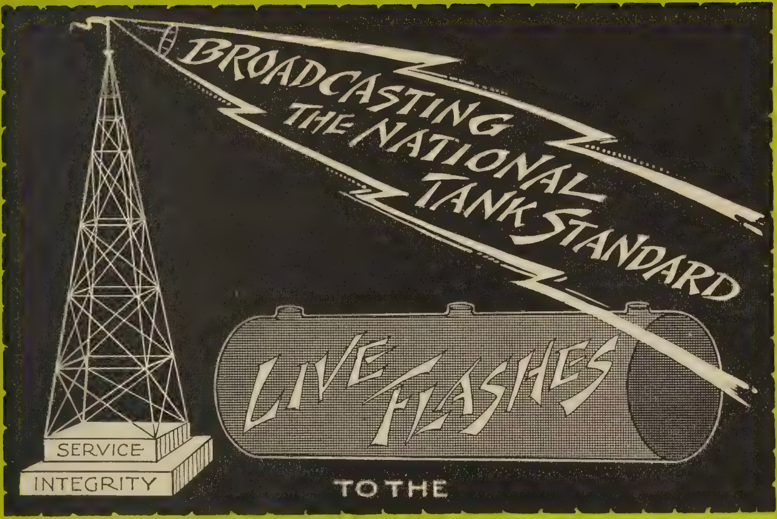
Burner Life 20 Years

As we enter the year of 1925 it is possible for the home owner, if he is well advised, to secure a heating plant and an oil burner that is efficient, safe and which if reasonably cared for, should have a life of twenty years, especially if a moderate allowance is made for repairs. The present situation is such that if proper engineering advice is received and followed, and provided further, approximately present prices of oil and anthracite obtain, that home heating with oil has demonstrated its vast superiority to home heating with anthracite coal. This accomplishment has been made rather quietly and marks as great an improvement in human happiness and increased home comfort as did electric lighting, the telephone in the home, or the automobile in the family service. The fly in the ointment at the present time is the incompetent manufacturer and dealer engaged in a fine industry that has so great a promise.

Future of Vital Interest

The future of our industry, of course, is of vital interest to the manufacturer. The outstanding features of the domestic oil burner are a fan for furnishing the air, a motor to drive the fan, pumps for handling the oil and the various control elements used with the machine. If we are to go on and improve our product, it will not be done by radical changes in present design. The automobile, the aeroplane, the telephone and radio have made their advances by refinement of early design, and improvements that mean a betterment here, a betterment there, and betterment elsewhere in the apparatus. The year of 1925 will see betterments here and there in the leading oil burner models on the American market today. I am of the opinion, First: That we shall obtain fans that will supply our burners with a greater degree of quietness. Second: That we shall obtain electric motors that will without any question whatever operate continuously for 2,000 hours with one lubrication of the bearings. Third: That we shall see domestic burner controls that will automatically put the burner through the starting cycle should there be a temporary interruption in the electrical current supplied to the motor. Fourth: That we shall find our leading municipalities compelling all oil burners to be provided with ultimate safety control; by which I mean a device that will open the electric circuit provided the temperature of the boiler, be it steam, or hot water,

(Continued on page 64)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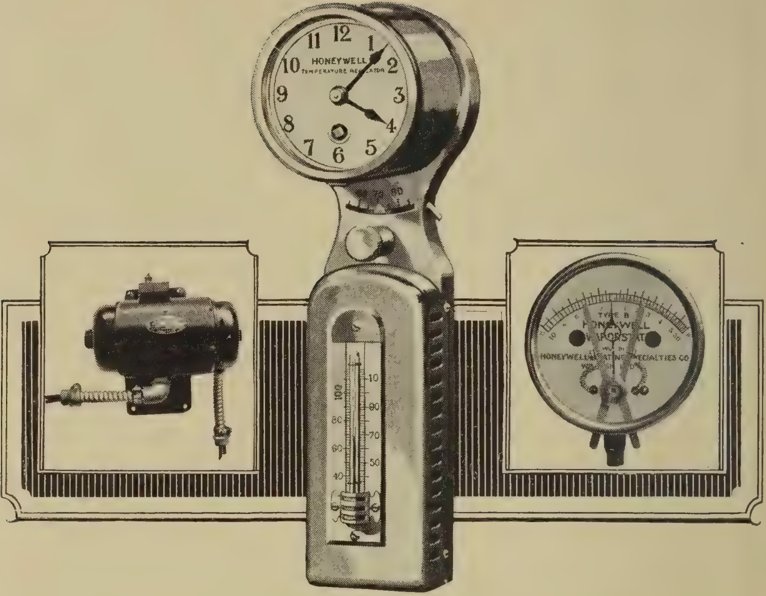

1925 will see an enormous increase in the installations of domestic oil burners. The degree of satisfaction rendered the users will depend largely on whether or not these burners are equipped with thoroughly dependable Automatic Temperature Controls.

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Wabash, Indiana

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HONEYWELL
Temperature Regulators

Getting the Customer's Viewpoint in Oil Burner Sales

By Harry Conover *

ONE evening about a month ago, a salesman of fuel oil heating systems for residences called at my home. He showed me numerous photographs of his machine, pointed out the principles of operation, described at length its various unique technical features and finally displayed a beautiful photograph of the plant in which the machine was fabricated. He concluded his solicitation by telling me that I should install his machine in my home, and when I refused he asked that I keep his card and get in touch with him, should I change my mind.

A week or so later I was visited by a representative of a rival manufacturer. After introducing himself he stated that he was a trained heating and ventilating engineer, as well as a salesman and said that he would like very much to make an examination of my heating plant. He added that he might be able to show me how I could make myself more comfortable during the coming winter. He felt that even should I decide not to substitute oil for coal, he might be able to offer suggestions toward the improvement of my present heating facilities.

"SALESMAN No. 2 was successful primarily because he analyzed my particular needs and had shown me how they could best be served. He discussed my home, my comforts and my investment and only brought in the subject of his product in its relationship to my own personal comforts and desires. He had placed himself in my chair and discussed everything from that viewpoint."

I was interested. We started with the attic and went through every room. Mr. Salesman measured the heating surface, noted the size and location of the radiators, examined the weather stripping and noted the thickness and character of the walls. Finally, when we reached the cellar, I was told, in terms of a heating expert, the strength and weakness of my heating system, where and how it could be improved and especially how I could effect some very substantial economies.

He then showed me where an oil burning system would eliminate the handling of ashes. He pointed out that the frequent installation of coal was depreciating the value of my home through its attendant accumulation of dust. He indicated the place where the fuel could be piped in without the deliverer entering the basement, and outlined a number of other very definite advantages which accompany this type of heating system.

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* From an address before the Annual Convention of the Associated Business Papers.

Before departing he also explained to my wife that one of her neighbors had found his system to be of great assistance in keeping her house clean throughout the winter and suggested that she get in touch with her for particulars. He then briefly described his machine, its advantages, told us the size we should have for our home and promised to send us within the next twenty-four hours a complete B. t. u. analysis of our heating plant, and also particulars regarding the space necessary for his machine, its cost, advantages, etc. Within a very few days we had placed an order for this heating system.

Why did Salesman No. 2 succeed in this sale when Salesman No. 1 failed? Both were representing good companies; both machines have been formally approved by the Board of Underwriters and both can show a large number of successful and satisfied users. Neither man had a particular advantage in personality, appearance, flow of language, nor the other standard qualifications which go to make up the individual who would be a successful salesman.

Salesman No. 2 was successful primarily because he had analyzed my particular needs and had shown me how they could best be served. He discussed my home, my comforts and my investment and only brought in the subject of his product in its relationship to my own personal comforts and desires. He had placed himself in my chair and discussed everything from that viewpoint.

If I were asked by the sales manager of a fuel oil heating system I would certainly now be able to advise him most effectively as to the approach his salesman should make in selling his equipment.

Crane Places New Domestic Boiler On Market

F. R. Crane, Jr., Chicago, Ill., has on the market placed a new water-tube boiler, designed especially for use in homes and small apartment buildings. According to the announcement, it comprises two headers connected together with brass tubes, and is set in fire-brick, with baffles placed so as to allow long flame travel, which is said to allow rapid heat absorption. Efficiencies as high as 83 per cent overall, are claimed by the inventor.

Reduced Fare Available

Reduced railroad fare, on the "certificate plan," will make a saving of one-fourth available to all those in attendance at the second annual meeting of the American Association of Oil Burner Manufacturers in Chicago, April 1, 2 and 3, according to Leod D. Becker, executive secretary.

More than 20,000 Nokol automatic oil heaters have been installed in the United States, according to recent statements of the American Nokol Company, Chicago.

The Principles of Automatic Burner Ignition and Control

By J. C. Bogle *

THE primary purpose of control in automatic intermittent oil burners is to start them when heat is required and to stop them when the temperature requirements have been satisfied. The purpose of boiler controls is to augment the supervision which the thermostat exercises over the burner, although they are of great value in the prevention of wide temperature variation due to overtravel. The purpose of ignition control is to get the fuel lighted with as little complication and expense as possible. The purpose of ignition safeties is to curtail the continuance of any illicit or unauthorized sequence of operations.

Before entering a discussion of the various schemes employed in igniting oil by automatic means, it is interesting to review the fundamentals of any process of kindling.

Aluminum Will Burn

Aluminum, for example, is commonly accepted as an incombustible. Yet when rolled to an imponderable ribbon it will burn like guncotton, and when finely powdered is a high explosive. The only difference between aluminum in one form and in the other lies in the relative exposure of surface in terms of its mass. This increased exposure results in a more rapid absorption of heat in proportion to the mass involved, and finally it results in a readier application of oxygen.

Iron filings thrown into a candle flame respond in similar manner. Increase the size of the particles and we soon reach a point where the temperature of the flame is insufficient to kindle. Decrease the size of the particles and a pin point of flame will be sufficient to fire them.

Fine Particles Best

In an oil burner, the finer the fuel particles are divided, the more readily will they be kindled. Because the ratio of mass to surface area is reduced and less energy will be required to raise the masses to their kindling points, in vaporizing them and in firing them.

For before the individual fuel particle can be burned it must be vaporized by the means provided for kindling. So the fuels which flash at the lower temperatures are more easily ignited than the heavier oils, even assuming the same degree of atomization in either sample.

The extent of the preheat is important, for the kindling means must supply heat to the fuel particle in sufficient quantity to raise its temperature past the point of volatility until it is finally ignited. Starting at a lower temperature, more heat must be added to reach the required temperature.

Finally, we should consider the question of sustained atomization. In this respect the consumption of

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* Absolute Contactor Corporation.

liquid fuel for heat production is like the burning of fuel within the cylinder of an internal combustion motor. Here the mixture is proportioned in the throat of a venturi. In turn, the larger fuel particles are flung out of the air train and are allowed to impinge upon a hot surface in order to augment atomization with a certain degree of vaporization. Later, the mixture is passed through a manifold carefully apportioned to the velocity which the gas must develop under certain critical conditions. Finally the vapor is discharged into the cylinder.

Like Inferior Carburetion

As it enters this enlarged space the velocity is checked, and in consequence a phenomenon occurs which has raised a great deal of controversy. Whatever may be the exact accounting for the observed results, the behavior somewhat resembles a slightly inferior carburation. So let us assume that the effect on the fuel of the enlargement of its restraining temperature with consequent loss of velocity is an action similar to the coagulation of the fine fuel particles into particles of larger size which are kindled with more difficulty.

It is undeniable that the Ricardo principle, by virtue of maintaining the mixture in constant motion up to the time of ignition, secures a higher rate of flame propagation. This kneading and harrowing of the mixture may be considered simply as an effective manner of sustaining carburation.

We must atomize a fuel before we can burn it unless we have recourse to wholesale preheating. To make ignition easier, the utmost fineness of fuel particles should be obtained and sustained.

The apparently similar characteristics to be noted in the burning of a vapor in a cylinder and in a firebox suggests a comparative examination of the methods of ignition practiced today by the builders of oil burners. It is possible almost at the outset to declare an axiom. The more perfectly is the fuel atomized, and the more effectively is this atomization sustained up to the application of the kindling means, the more effective will a given system of ignition become. It will be observed that this applies to ignition only. There are other determining considerations than simply ignition to be taken into account in the production of a satisfactory oil burner.

Accepted Methods Limited

The most widely accepted methods of igniting intermittent burners employ either gas or electricity. With electricity we are limited to the energy dissipation of an electric spark. With gas we have practically no limit. With a given oil the gas flame may be reduced in size provided especial attention is devoted to atomization. Electric ignition, in every case that has come to the writer's attention at least, is predicated upon the injection of oil under pressure, or by the use of mechanical flingers, which mix the oil and air and immediately ignite the mixture while it is at the peak of its velocity.

Naturally, if a considerable quantity of gas is burned in the ignition process, the bill reacts violently

(Continued on page 58)

The Place of Furnace Oil in the Oil Industry

By O. P. Keeney *

MY study of this subject began when I first became personally interested in it four years ago by more or less heating of my own home with oil. In preparation of this paper, however, my investigations were along broader lines. An examination of much which has been written, and my endeavor to reconcile the violently varied personal theories of members of the Industry, convinces me of one thing. This is the outstanding fact: There is a real need for the Petroleum Industry to try and determine what the place of furnace oil *should be,* and to help put it there! In deference to the opinion of some, perhaps I should add: or help put furnace oil out of the Industry, because all of our oil resources will be exhausted within a few years, or there won't be enough to go around.

> *"IT seems possible that the oil burner will replace the coal furnace more rapidly than coal replaced wood, or than the wood stove supplanted the open fireplace for household heating. Leaving out the factor of economy, or even accepting the factor of additional expense, the use of furnace oil provides increased heating effectiveness, a higher degree of cleanliness, greater convenience and comfort, and avoidance of drudgery."*

Despite the fact that the exact place furnace oil now occupies cannot definitely be determined, it is a fact that furnace oil at the present time is a growing factor and that the subject cannot be dismissed as some tried to dismiss it a few years ago with the bland remark—"There ain't no such animal and there ain't going to be any."

No important utilization factor of petroleum sprang full-fledged into prominence without passing through an experimental period of development. But many of these experimental periods, as one looks back, would be considered to have occupied too long and unsatisfactory a period, judged by up-to-date research and technique developing standards. Without magnifying the possibilities of the extent of the development of domestic heating with oil, it can be said that there is perhaps here a new utilization factor of petroleum products of tremendous importance to our Industry. As long as this possibility exists, the solution of the problems involved should be sought in a concerted, determined, result-getting manner.

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* Tidewater Oil Company. From a speech delivered before the American Petroleum Institute.

The use of fuel oil for domestic heating dates back comparatively few years. It was not until 1887 that a few of the Western railroads began to burn oil. After the inauguration of oil in this service, there was a progressive development along scientific lines in the science of oil burning. Shortly thereafter the smaller types of burners for domestic heating purposes appeared in certain territories. The design of the early types of domestic oil burners sprang from the minds of individuals who had the vision of the attractive possibilities of using oil successfully for household heating. The idea continued to grow and further refinements were made continuously over a period of years—the last three years in particular have seen a vast amount of experimental work undertaken to develop a satisfactory domestic oil burner.

Many Burner Patents

In 1922, one hundred and thirty-six patents of various types of oil burners were granted by the U. S. Government Patent Office. In 1923, there were two hundred and twenty-seven oil burner patents issued. In the eighteen years previous, a total of eighteen hundred and sixty-seven patents for oil burners were granted.

To date it is estimated that more than 5,000 patents of combustion devices and furnaces have been issued, which does not exclude those patents which have expired, but which are in use. Of the total number of household burners which are now being exploited, approximately 300, there are only twelve which have been approved by the National Board of Fire Underwriters at the time of the preparation of this paper. I understand, however, that they are continually examining new burning devices submitted to them by the manufacturers for approval, and this list of twelve will undoubtedly be increased in the near future.

Climate Affects Development

Oil burners have been developed to function in accordance with the various climatic conditions throughout our country. The public, in the sections where there is a season of cold weather, have been educated and encouraged by the majority of the burner manufacturers to use burners which are fully automatic in operation. In the milder climates semi and non-automatic systems have been used. The domestic oil burners are of three types: (1) The natural draft burner; (2) The forced draft burner; (3) The rotary type burner. The natural draft type of burners at the present time requires a high grade of kerosene distillate or unfinished kerosene, while the forced draft and rotary types can use kerosene distillate, and in some cases the higher grades of fuel and gas oil.

Certainly at the present time, furnace oil, including in this term all liquid petroleum used for house heating, is *a real* factor in the Petroleum Industry. It seems possible that the oil burner will replace the coal furnace more rapidly than coal replaced wood, or than the wood stove supplanted the open fireplace, for household *heating*. Leaving out the factor of economy, or even accepting the factor of additional expense, the use of furnace oil provides increased heating effectiveness, a higher degree of cleanliness, greater convenience and comfort and avoidance of drudgery. These are all things the American people desire and are to a greatly increasnig extent securing for themselves in many ways.

A very careful estimate shows that by January 1, 1925, there will be actually in operation 248,000 household oil burners. The annual consumption of these burners is variously estimated at from 600,000,000 to 800,000,000 gallons of furnace oil. Taking the lowest figure, this year furnace oil may be considered to replace 4,000,000 tons of coal.

Lack Accurate Facts

You have undoubtedly already noticed my frequent use of qualifying phrases like "carefully estimated," "probable," "considered," etc. One of the outstanding features of the situation now is the lack of accurate information. An earnest searcher for actual facts comes to the conclusion that "this ignorance is not bliss." I have been informed that a questionnaire was sent out to the burner manufacturers requesting information as to their output of burners, the number in actual service, the grade of furnace oil required and similar pertinent facts which legitimately could be asked. Either from failure to consider the importance of co-operation or because of the rush of orders they were obtaining for oil burners, only five replies were received from the 500 letters sent out. For the sake of impartiality I might add that the Oil Industry is not collecting statistics in such a way as to show either the actual or potential quality of the various grades of furnace oil manufactured from its current crude runs or the quantity being delivered to homes.

(Continued in the March Issue)

French Establish New Petroleum Regime

Late in December, 1924, the French Senate adopted the bill recently voted by the Chamber of Deputies relative to the establishment of a new regime for petroleum and its products, according to recent reports of the Department of Commerce. This law provides for the establishment of a new Bureau for Liquid Fuels under the Ministry of Commerce and Industry, the personnel of which is to be designated by the administrative council. The general work of this new bureau will be to gather and to furnish interested French organizations and manufacturers, either through special reports or general publicity, or by any other means, with information and data which may concur to the improvement of the service of supply of the country in liquid fuels of any kind.

Owens Heads Committee

J. W. Owens, of the Federal Guage Company, 564 W. Adams Street, Chicago, has been made chairman of the committee on arrangements for the second annual meeting of the American Association of Oil Burner Manufacturers in Chicago, April 1, 2 and 3.

Confer On Government Shale Oil Production

The means for future production of oil from government reserves of coal and oil shale was the subject of a conference held at the Interior Department, Washington, recently by technologists of the Navy, the Bureau of Mines, and the Geological Survey. A research program to aid commercial development of processes by which oil may be obtained from oil shales, lignite and other coal is being planned by the Bureau of Mines.

The passage through Congress of a bill appropriating $90,000 for an experimental oil shale plant on Naval Reserve No. 2, in Colorado, is now virtually assured. Recent additions of territory to the two reserves in Colorado have brought the estimated total oil content of the shale deposits there to over two and one-half millions of barrels.

It is reported that tests performed on samples of shale taken from an immense deposit in Manchuria disclosed an oil content of 7 per cent. Another report is to the effect that shales common in Tasmania and Australia yield 60 gallons of oil per ton and torbanite deposits found in Africa to cover at least 40 square miles average 97.3 gallons to the ton.

The first shale oil retorting plant to be built for commercial purposes in the United States—that of R. M. Catlin, at Elko, Nevada—is still in operation and is keeping up to its capacity operation of 100 tons throughout daily. Mr. Catlin has been working toward successful commercial production of shale oil since 1917 and the performance of this plant to date indicates that he has about attained his goal. A large percentage of all shale oil can be used for fuel oil.

Say Bunkering Stations Have Doubled in Number

Director Eves, of the Anglo-Persian Oil Company, Ltd., in an article on fuel oil published recently in England, declared that within four years the oil bunkering stations of the world have been practically doubled and that there are now nearly 300 ports where vessels may obtain fuel oil. He stated that the current price discredits the reports of the possible exhaustion of the world's oil fields in the near future.

Fulton Company Develops New Valve

Among several new bulletins issued recently by the Fulton Company, Knoxville, Tenn., is one devoted to the new interlocking valve which has been developed and placed on the market by this company. It is a safety appliance designed to protect oil fired boilers or furnaces by automatically shutting of the fuel supply when the atomizing pressure fails, or is reduced below the required minimum.

The Maxon Premix Burner Company, of Muncie, Ind., has consolidated with the Maxon Furnace and Engineering Company, also of Muncie. The consolidated companies are operating as the Maxon Premix Burner Company.

Teagle Says Fuel Oil Regulates Oil Industry's Prices

FUTURE crude oil price levels will be dependent in part upon what is realized for fuel oil, according to W. C. Teagle, president of the Standard Oil Company (N. J.), in his recent speech before the American Petroleum Institute. He stated also, that "the situation of the oil industry will be improved as the use of fuel oil in competition with coal is decreased and its uses for superior purposes further developed."

Cracking Operations Sufficient

"For some years to come," he said, "we should be able to obtain sufficient fuel oil from the production of fuel crudes and the residue from refining and cracking operations to be able to meet the economic demand for this product. By 'economic demand' I mean the amount of fuel oil that can be sold at prices not solely dependent on the cost of coal. East of the Rockies the problem is to find an economic outlet for fuel oil at a price which will return to the refiner at least the cost of his crude. West of the Rockies, fuel oil, as already stated, is not directly competitive with coal. The fuel oil content of the various grades of Californian crude is the base in determining the posted prices which have been graded in accordance with their naptha content. So that the suggestion of applying the value of the fuel oil content is neither new nor revolutionary.

"I am firmly convinced that a more satisfactory market for fuel oil can be developed by the industry. I have not maintained that we must have cheap crude as long as coal entered into competition with fuel oil. If time permitted I would like to discuss why the refiner continues to regard the demand for fuel oil as only an outlet for his surplus. No one can tell how far-reaching will be the trend toward the displacement of coal for household use by furnace oil. There are those in this audience who believe that the industry can well afford to spend millions for the purpose of popularizing furnace oil, sold not in competition with coal, but on the basis of its intrinsic value. They are convinced that when the public knowledge of the manifold advantages of furnace oil has become general, and equipment and distribution facilities developed, consumers will be willing to pay a price which will justify producing and running crude for the market thus created. There are other ways of establishing fuel oil on a higher market plane, and any increased price should be reflected in crude values.

Fuel Oil Underestimated

"If it is true that the industry has underestimated the importance of fuel oil as a factor in the price structure, the question naturally arises as to the relationship of this factor to the production of crude.

The answer appears to lie in the general recognition of fuel oil as the best single index we have today of the conditions existing between supply and demand. When the supply of fuel oil is so large as to force upwards of 150,000,000 barrels in a single year into competition with coal, it should be plain that overproduction exists. Any price that encourages the uneconomic use of oil should be a warning to the producer."

Jacobs Discusses Oil Burning At Engineer's Meeting

An interesting account of the development of fuel oil heating and the present status of the oil burner industry in Canada was given by Lionel L. Jacobs, manager of the Fess Oil Burners, Ltd., of Canada, at a recent meeting of the Ontario Chapter of the American Society of Heating and Ventilating Engineers. Under the title, "The Use of Fuel Oil in Commercial and Domestic Heating Plants," Mr. Jacobs gave a short history of oil burners together with a description of the installation, maintenance and operation of the average domestic burner on the market in Canada.

Speaking of burner installation, he said: "Almost every boiler plant presents its own problems, and the peculiarities of the boiler to be equipped have to be co-ordinated with the characteristics of the burner to be used, and if they will not co-ordinate a different type of burner must be selected.

"The majority of installations have to be made on existing boilers which have had to be adopted as could be best and most cheaply done, and some installations have given poor results because the purchaser would not go to the expense of the changes necessary for the best operating conditions, others because the concern installing the equipment did not understand the importance of installation and expected the burner to give equal results under all conditions when similarly installed. On the whole, however, the results have been very fair, and today there are many excellent examples in operation in Canada.

"Probably one of the most outstanding examples in Canada is that of the Fort Plant on Danfort Avenue here in Ontario, where three B and W boilers having a rated capacity of 200 h.p. are being operated at 250 per cent of rating at high efficiencies."

Everbrite Issues Folder On Radiant Burner

Everbrite Radiant heaters are described in a folder that has been published by the Everbrite Stove Company, Kansas City, Mo. The Everbrite is a preheating burner which converts its kerosene into gas before introducing it into the combustion chamber. Although made primarily for use in fireplaces, it is claimed by its manufacturers to be portable. It has no fixed connections, the burner and tank being made in one unit, hence it can be moved from room to room, wherever its presence is desired.

The King Refractories Company, Inc., Buffalo, N. Y., has issued a pamphlet describing its "Flame Brand" high temperature cements.

Elegy Written in a Country Coal-Bin

The furnace tolls the knell of falling steam,
The coal supply is virtually done,
And at this price, indeed it does not seem
As though we could afford another ton.

Now fades the glossy, cherished anthracite;
The radiators lose their temperature:
How ill avail, on such a frosty night,
The "short and simple flannels of the poor."

Though in the icebox, fresh and newly laid,
The rude forefathers of the omelet sleep,
No eggs for breakfast till the bill is paid:
We cannot cook again till coal is cheap.

Can Morris-chair or papier-mache bust
Revivify the failing pressure-gauge?
Chop up the grand piano if you must,
And burn the East Aurora parrot-cage!

Christopher Morley.

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Hazards of Industrial Oil Burning

By H. E. Newell*

THE question of proper flash-point requirement for oil fuel has been discussed at great length, but to date the consensus of opinion appears to be that 150 deg. Fahr. closed-cup tester is a reasonable one. This figure has been adopted by the U. S. Navy, the American Bureau of Shipping, the British Admiralty, Lloyds, the National Board of Fire Underwriters and the National Fire Protection Association. In recent years considerable opposition to this figure has been evidenced, the claim being made that it was arbitrarily determined and is not the result of tests and scientific investigation. It is true that the origin of this requirement is doubtful, but in a recent unpublished report of an investigation made by the Navy Department to determine a safe flash point, the conclusion is reached that the aforesaid figure is a safe and reasonable one. Probably the most serious objection to it is from a portion of the oil industry on the ground that it prevents the use of lower-flash oils, otherwise suitable as industrial fuels.

This established flash point prevents the use as fuel of untopped, or in other words crude, oil. There are, however, in Mexico extensive fields of low-grade asphaltum oil of volatile content claimed to be too low for profitable refinings. Panuco River oil is of this type; it comes from the well flashing at ordinary temperature and has a maximum volatile content of from 3 to 5 per cent. Despite regulations, much of this oil has been shipped to and is now in use here in the States. Topped oils of asphaltum base flash considerably above 150 deg. Fahr. The question naturally arises, does the use of untopped oil materially increase the general hazard? Being a crude oil, its volatile content, no matter how slight, is given off at ordinary temperatures thus increasing the usual hazard incident to filling, and in general handling operations. While in storage under normal conditions, vapor is continually given off, thereby increasing the hazard of leakage.

Objections Not Wholly Valid

These objections probably are not wholly valid so far as crude oils with volatile content as low as that of Panuco oil are concerned, but what assurance would there be that crudes of even greater volatility would not be used? It might be argued that economic factors in the oil industry would prevent this, but in answer to this it is pointed out that in the West, ordinary mid-continent crudes of mixed base have been used as fuel when the price was low. Another objection is the possibility of unburned oil finding

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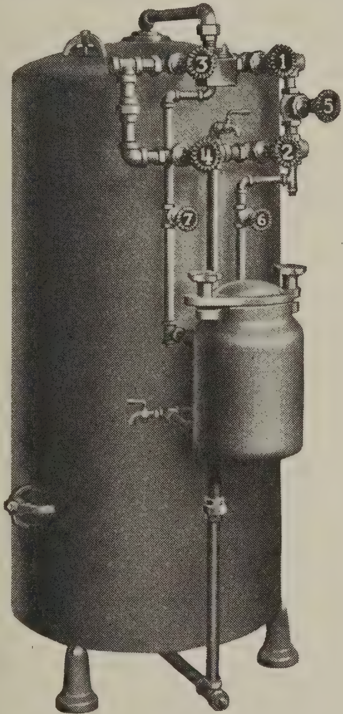
* National Board of Fire Underwriters' Sec., N.F.P.A. Committee on Flammable Liquids. From a paper presented at the Annual Meeting of The American Society of Mechanical Engineers.

Oil Burner Distributors and Dealers

We have an interesting proposition to make you on the sale of Graver Household Water Softeners.



Oil burner prospects and users are all prospects for a water softener. You can keep your entire sales force busy the year around.

The Graver Water Softener is not a new proposition. It will live up to its guarantee, made by an old, responsible concern. Graver Corporation has built Water Softeners for over 15 years.

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its way into the combustion chamber, vaporizing there and igniting so rapidly upon starting up, as to form an explosion of force sufficient to blow out the front of the boiler setting.

Before topping, the crude oil is freed of the greater part of free mineral or organic matter by agitating and washing; thus the residuum used as fuel oil is free of such matter and naturally carbonization troubles in combustion are thereby greatly reduced. In the case of crudes used as fuel, however, these cleansing processes are not performed, hence their use tends to increase this troublesome feature in oil burning. This feature is mentioned, as it has indirectly been the cause of numerous fire-and-smoke-damage losses in oil-burning installations.

Special Fittings Necessary

It is true that Lloyds and the American Bureau of Shipping permit the use of untopped oil, but only when the ship is specially fitted for such a fuel. The Battle of Jutland illustrates the desirability of topped fuel oil; six British destroyers were hit by the Germans, yet, of the four fires resulting only two were oil fires; in one case the supply pipe was ruptured but the resulting fire was quickly extinguished. In both instances the fires would probably have spread rapidly beyond control had the oil been a crude, as vapor would have been liberated immediately upon exposure of the oil.

It may be, as claimed, that the difference in hazard between an oil of 100 deg. Fahr. flash point and one of 150 deg. Fahr. flash point is largely theoretical, and not serious enough to cause concern, but until comprehensive tests have demonstrated the latter, wisdom clearly points to the established figure.

Flash Point Important

The subject of flash point is closely related to that of heating oil in storage. Mexican fuel oils, and in fact all asphaltum-base oils, are so viscous as to necessitate heating in order to permit of pumping to the burner. This does not relate to the preheating designed to facilitate atomization. The National Board regulations prohibit heating oil in storage to more than 40 deg. below the flash point; and thermostatic control of temperature is advocated. Thus in the case of 150-deg. flash oil, 110 deg. would be the maximum permissible degree of heating.

Many engineers claim that this requirement is so drastic as to be impracticable, for the reason that much of the Mexican fuel oil is so heavy as to require heating to considerably above the permissible point. In marine practice, it has been pointed out, it is quite usual to heat the oil up to its flash point, this being necessary in the case of oils of 10 to 12 deg. B. A theory advanced is that the mixture resulting from heating to flash point is so rich as to render the support of combustion impossible. But is this true It is apparent that the entire body of oil within the tank is not uniformly heated, the oil away from the immediate vicinity of the heating coils being at a lower temperature. Vaporization is of course increased, but it seems more reasonable to believe that there would be a series of mixtures above the liquid level, or in other words, the space above the liquid level would be stratified. Reasoning further along this line, is it not possible that these mixtures would cover the greater part of the explosive range of the vapor? This is merely theorizing, it is true, but it is well known that stratification occurs above the liquid level in all tanks containing volatile liquids. If crude oil or low-flash oil were permitted, vapor would be given off more steadily and probably the mixtures above the liquid level would be richer, but as in the case of higher heating temperatures of permissible fuel oils, the usual vapor leakage hazard would be greater. The argument might be advanced that marine practice has not proved higher heating of oil in storage to be a material hazard, but in answer to this it is suggested that no marine records are available, that there have been numerous fuel-oil fires in connection with marine equipments and that full explanations have not been forthcoming. It is also pointed out that the Navy prohibits the heating of oil to or above its flash point in any part of an oil-burning system, except between heaters and atomizers.

Tests Necessary

It is conceded that there is a theoretical phase to the question and that it can only be settled by comprehensive tests, but certainly, in the absence of conclusive data, it is only sound engineering to be conservative.

When starting up a new burner after a long period of idleness, care should be exercised to insure that the oil system is free from waste, flakes of shellac, red lead, and dirt, by thoroughly blowing through with air. All strainers should be cleaned and any wire mesh found to be defective, removed. Cleanliness of atomizing tips and other parts of burners should be insured and they should be properly adjusted in the air registers. The latter should be tested out to insure their working condition. Individual control valves to each burner should be closed. If air chambers are fitted on the oil lines they should be drained and then charged with compressed air. Valves in pump suction lines should be opened. Blowers should be warmed up and ready to turn over. In lighting, a hand torch should be used, the fireman standing well away in order to avoid a flareback. No matter how hot the furnace may be, if all burners are temporarily out, no effort should be made to relight from the incandescent brickwork. The most serious accidents have been occasioned by this practice. A suitable lighting torch may be made by securing on the end of a rigid wire rod about 2½ or 3 feet in length a few loose ends of asbestos wicking which may be dipped in oil.

Unburned Oil Dangerous

Every precaution should be taken to prevent unburnt oil from collecting in the furnace, as the hot brick gasifies it and there is serious danger of a violent explosion. Proper precautions will eliminate such dangers.

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A flareback is caused by an explosion of a mixture of oil and vapor or gas and air in the furnace. Such an explosion may cause grave injury to the burner and serious damage to the boiler, its fittings and attachments. A flareback is most likely to occur in lighting up or in attempting to relight an atomizer or burner from a hot brick wall. The following precautions should be observed to prevent flarebacks.

1. Do not permit oil to accumulate in the furnace. Oil on furnace floor should be wiped up and the furnace blown through with steam or air before lighting the burners. Burner control valves must be kept tight at all times to prevent leakage of oil into the furnace.

Torch for Relighting

2. Whenever burners are accidently extinguished, shut of the oil and blow through the furnace with steam or air before relighting. Never attempt to relight a burner from a red-hot brick wall. Use a torch.

3. When a flareback occurs, close the master oil valve shutting off all oil to the furnace.

4. Speed up the blowers if in operation. Shut down oil pumps.

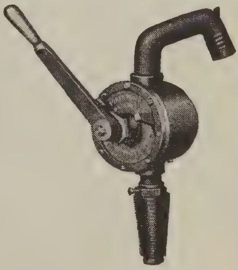
Attention is directed to the serious hazard arising should dampers in the flues to the stacks be closed or induction fans be inoperative at the time the oil is being ignited. Owing to the liability of explosion, the operator must assure himself positively that all vents are clear and open before starting the fire.

During operation care should be exercised that atomizers or burners are never left disconnected; the operating cock or valve might be unintentionally opened which would result in oil running into the boiler room with disastrous effects.

Avoid Flash Point Heat

The temperature of fuel oil should never be raised to or above the flash point in any part of the system except between the preheater and the atomizers or burners. The more viscous the oil, the more necessary is it to reduce the viscosity to a low point to obtain good atomization, and the more difficult is it to do so. To obtain the best combustion, it may possibly require heating the oil to a temperature high above the flash point, which is deemed a dangerous expedient unless extreme care is taken to guard against leaks in the oil lines.

In brief, the safety of a fuel-oil system against fire and accident depends, first, upon the quality and strength of materials employed in construction; second, upon the manner of installation, and third, upon the maintenance and operation of the system. To insure the latter, every member of the boiler-house force should be thoroughly acquainted with every detail of the installation. He should understand the operation and the purpose of the atomizers or burners, registers, pumps, heaters, blowers, strainers and all other equipment. It is particularly important that he know the location and the proper manipulation of all valves and manifolds and that he be able to locate them and manipulate them when the room is in darkness.



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Heating the Home

Sound Technique in Burner Installation

By George W. Graves *

WHEN it comes to actual installation of the burner, this should be handled in the best workmanlike manner possible. The attitude of the workman, as pertains to his appearance, conduct, language and method of work, is always subject to observation and usually to criticism either during the process of installing or after completion.

The reputation of a dealer's organization is based to a large extent upon these factors. The installation men, therefore, should be impressed with the fact that each one should give his best efforts. It is a good practice for all workmen to refrain from conversation and particularly from impressions and theories, either personal or acquired, when in contact with users. Distributors say that great difficulties have arisen from such remarks, statements and opinions from men in their employ who were not properly qualified for decisions.

THIS article deals with installation of the oil burner and follows several articles by the same author leading up to installation. Mr. Graves stresses constantly the necessity for careful, thorough-going work in installing and preparing to install the burner. The last of this series will appear in the next issue.

Every installation man should be thoroughly familiar with standard methods of installation as practiced by each distributor and by the common practice of various details before he be permitted to conduct his work. As noted previously here, each installation carried written instructions as to the work to be performed, special exceptions being particularly stressed which should be followed minutely without deviation. This does not mean that an installation man should not advance suggestions at the proper time for improvement over instructions. Such suggestions, however, should not be carried out until the installation man has consulted with the superintendent or some authorized member of the com-

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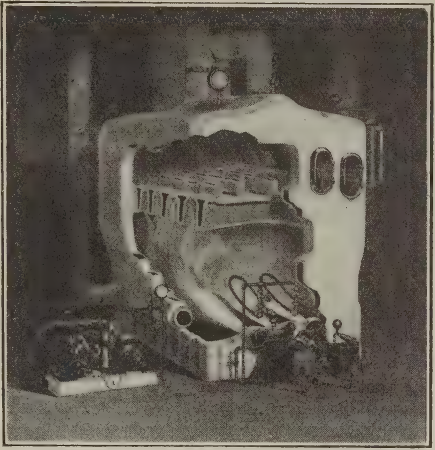
* American Nokol Burner Company, Chicago, Ill.



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Caloroil Burners are thermostatically controlled; automatic; simply and quickly installed; easily regulated and understood; made in standard sizes to handle up to 12,000 sq. ft. of steam radiation; cause no carbon, smoke or odor; use 28° Baume Gravity Oil; and have a special vacuum oil feed system — neither force feed nor gravity.

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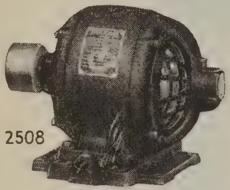

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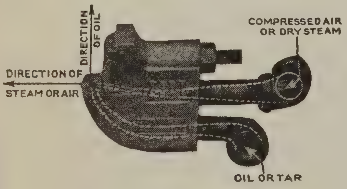
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COMPRESSED AIR OR DRY STEAM
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pany and secured proper approval.

It is of primary importance for every man to know exactly what is expected of him before going on an installation in order that he will be equipped to overcome any misunderstanding. Mistakes and improper work result invariably in costly operation and also have a certain unsatisfactory effect on the morale of the entire organization. Each installation crew should be properly equipped with tools necessary for the complete installation which will assist efficient workmanship in eliminating delays and thus expedite operations.

Following the method of complete survey previously set forth, all necessary material is delivered to the crew before going to the job. This prevents delays and unnecessary trips to the jobs for shortages, if the bill of material is carefully compiled and executed. Installation crews should also systematize their work to avoid interference or loss of time. An installation of any kind can be properly taken care of by a crew of two men. In the event the installation includes an underground storage tank, it has been found advisable to have this work performed by an independent company versed in handling it.

Procedure Varies

The procedure on an installation is necessarily different in summer and winter months. In the season when no heat is required, the crew should first pull the grates and set the heater. Where it is necessary to remove the ashes or to move coal from the basement, the heater should be properly covered or left in an-

Double Value!

THE advertising pages of the April issue of FUEL OIL will be doubly valuable to advertisers.

THE second annual meeting of the American Association of Oil Burner Manufacturers will be held in Chicago, April 1, 2 and 3, and the April FUEL OIL will be a

Special Convention Issue

IT will contain concise, informative articles on every phase of oil burning; contributed by well known authorities. Besides being an encyclopedia of expert oil burning information, this Special Issue will be a veritable catalog of oil burning apparatus and auxiliary equipment. Your sales story will be read not only by everyone attending the Convention, but by some ten thousand who will not be able to attend, and will want to keep the Convention issue as a buyers guide throughout the year.

A SECTION exclusively for advertisers, printed on buff-colored paper, with blue ink, will occupy the center of the magazine.

JUST a word from you and we will send complete details.

FUEL OIL
for Heat and Power
350 Madison Avenue
New York City

other room to protect it from dust until this work is completed.

The burner should be placed in the boiler so that the top of the combustion chamber comes about level with the top of the old grate top line. Where the ash pit opening does not permit this, the burner should be placed as high as possible in the boiler without allowing the air pipe to touch the grate ring or any other part of the boiler.

The combustion chamber should be inserted in the ash pit so that it will come at least two inches back of the center line of the boiler. This is made necessary because there is a larger volume of water at the rear of the boiler than at the front, on account of the space taken up by the clean-out, fire and clinker doors. The air pipe should be extended exactly in the center of the ash pit and the heater should be square; that is, the combustion chamber should not be closer to one side of the boiler than the other.

Should Use Bricks

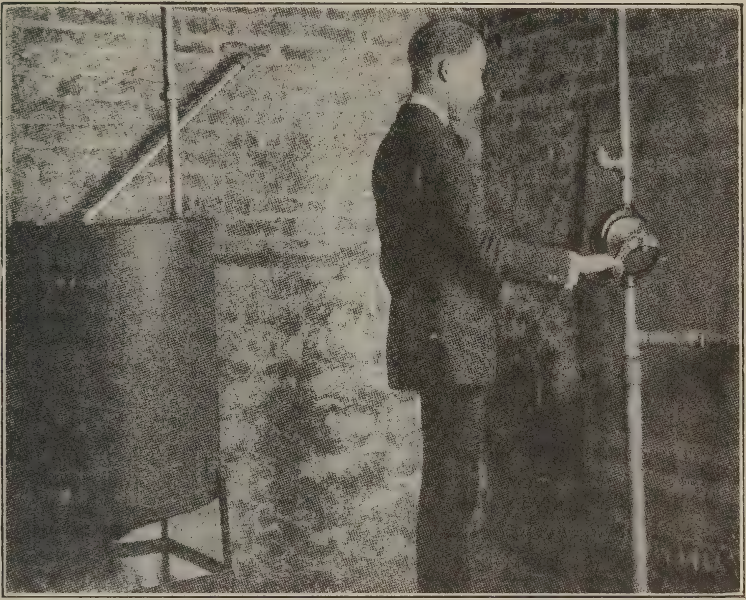
In the event it is necessary to raise the heater above the height given by the cradle, bricks should not be used. The old grate bars or some other firm support should be used. In setting the burner, it should be leveled first along the air pipe, then across the regulator and finally across the combustion chamber. After the heater is thus placed, it would then be well for one man to locate and place the tanks and run the oil line while the other locates the thermostat and runs the thermostatic wiring.

In the event a 200-gallon tank is used in addition to the 55-gallon

NIAGARA OIL METERS

Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.
2926 Main St.
Buffalo, New York



Play Safe

Many cities have fire ordinances which prohibit oil burning systems dependent upon gravity for transferring oil from the outside storage tank to the basement. Whether you are in one of these cities, or not, your installations should eliminate this risk by including a Blackmer No. 9 Hand Pump. Your customers will appreciate your precaution.

Great care is taken in the manufacture of all Blackmer Pumps. Every one is carefully tested before leaving the factory.

Model 9, a Blackmer in every respect, has a capacity of 12 G. P. M. It is made in either solid iron or solid bronze with 1 inch pipe connections. Write for prices.

BLACKMER
ROTARY PUMPS

Made by
BLACKMER ROTARY PUMP CO., Petoskey, Michigan

service tank, the 55-gallon tank should be placed far enough away from the wall to bring the openings of both tanks into proper alignment, which will permit a neater tank job. Ten gallons of fuel should be sent to the job in every 55-gallon service tank, so that as soon as the oil line is run from the tank to the burner, the valve can be opened, giving the men an opportunity to search for leaks due to defective fittings or connection.

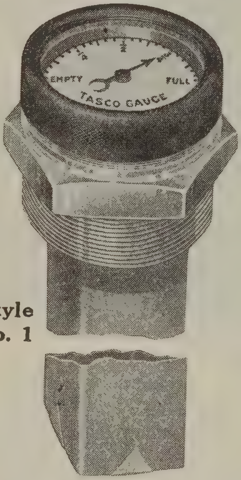
Cut Threads Carefully

In running the oil line, great care should be exercised in cutting threads, where that is necessary, as well as the proper assembling of fittings. There is no excuse for leaks due to defective threads or careless pipe fitting. If a leak does develop, it is imperative that it be corrected before leaving the job. Piping equipped with defective or worn threads should never be used. The threaded portion should be cut off and new threads cut. Proper care in starting the die and in handling the stock should invariably insure perfect threads, if sufficient lard oil is used.

Where it is necessary to cut threads, the workman should always use an old cloth or newspapers placed on the floor under the pipe vise to prevent the cutting oil from staining the basement floor. If the dies are worn so they will not cut a clean thread, they should be replaced. After new threads are cut they should always be carefully brushed with a stiff bristle or wire brush before being assembled with fittings. Litharge and glycerine should be used on every fitting and

"Tasco" Gauges

are standard equipment on more than 50% of all Fuel Oil and Oil Burning devices on which gauges are used.

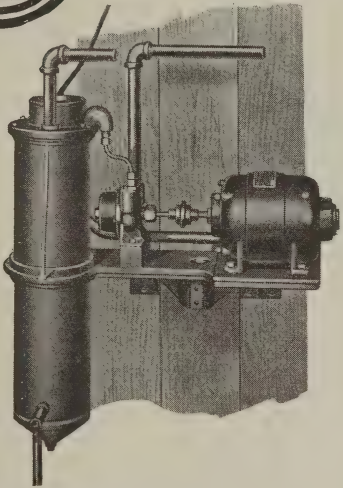


There are types for installation in ends, tops or sides of tanks—either with our standard flanges or with 1½ or 2 inch I P threads.

Send for complete information on different styles

The Akron-Selle Co.
"40 Years in Business"
Akron, Ohio

M-D-CO. Improved Automatic Control Pump Auxiliary Tank Unit



M-D-CO. Automatic Unit — accurate and positive in operation. Absolutely reliable. The only unit having the heart of the unit (control switch) under positive control built to do the work and value given for the money. Standard electric motor; standard M-D-Co. non-pulsating pump; bed plate of entire unit arranged with wall bracket as well as for pedestal support.

Circuit Completed in Sealed Glass Tube Containing Inert Gas and Mercury.

Control Switch. The Federal Mercury Tube Switch is so arranged to operate with the action of the float, tilting the mercury glass tube past center by a positive snap action, due to the correct proportion of float and switch levers.

Accurate and positive in operation. No arcing, no oxidation of contacts. Absolutely reliable.

Prompt deliveries. Hand and Power Pumps in various sizes and capacities to meet practically any and all conditions.

Write for Catalog A and Bulletin No. 461.

Mechanical Devices Company

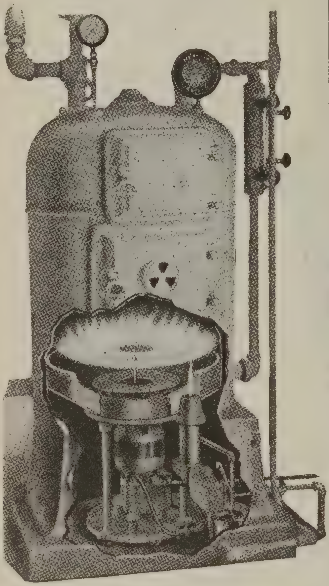
Main Office and Factory: Aurora, Illinois

Branch Offices:

Chicago Office
549 W. Washington Blvd.
Phone: Franklin 2471

Eastern Office
325 Federal Street
Greenfield, Mass.

SUPER
Automatic
Oil Heater
Safe — Durable
Perfect Combustion



Burns 28-32 Baume Gravity Fuel Oil for Home Heating.

Live Agents Wanted.
Write for Details.

Super
Oil Heater Company
Hartford Conn.

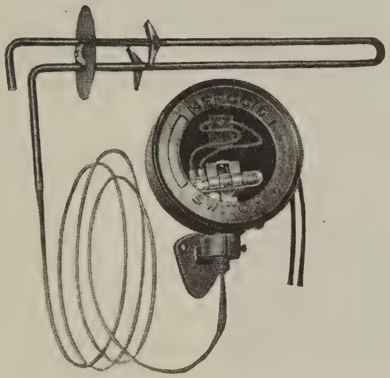
connection of the oil line. In applying litharge and glycerine, it is advisable first to catch one complete thread of the pipe in the fitting and then apply the compound, thus eliminating the possibility of clogging the fuel line by improper application of the compound. The installation man, when applying it, should see that it is completely around the threads, the latter being practically filled.

No galvanized fittings or pipe should ever be used and the bending of oil lines should not be permitted. It is advisable to inspect all fittings before they are used for defects such as sand holes or cracks in order to prevent the necessity for disassembling these parts in the event a leak develops. Ground joint unions with brass seats are the only type of unions that should be used. Piping should always be examined for splits and all foreign substance should be removed by blowing through or otherwise. In cases where the oil line is not buried under the floor the line should be run on the floor as close to the wall as possible around to the back of the boiler, circling the base of the boiler on the floor and connected to the fuel valve by means of a swing joint.

Manufacturing New Pilot Light for Burner

A gas pilot light for oil burners has been placed on the market by the Automatic Lighting Company, Baltimore, Md., according to recent reports. Another gas pilot light for oil burners is being developed by the Breese Engineering Corporation, Chicago, Ill., according to James L. Breese, Jr.

Federal Mercoid Furnace Control



For direct automatic control of warm air furnaces. When installed in the hood above the dome of furnace acts as safety device to prevent overheating of the furnace.

Designed to break the motor circuit at 300° F. and restore at 250° F., and adjustable.

No relay or remote control necessary on motors up to one H.P. where the working load does not exceed 10 amperes at 110 volts or 5 amperes at 220 volts, either A. C. or D. C.

Complete two-wire direct control of oil burner may be obtained when used in series with the FEDERAL MERCOID THERMOSTAT.

All Federal Mercoid Controls available for Single Pole, Double Pole, Three-wire, or Single Pole and Momentary Contact Types.

WRITE FOR BULLETIN E.

THE FEDERAL GAUGE CO. 564 West Adams Street
CHICAGO, ILL., U.S.A.

New-Type Oil Burner Proved for Six Years

Six years ago the first Oil-O-MATIC Oil Burner was made. Nearly 20,000 are now in use and every user is satisfied. Burns cheapest fuel oil. No continuous pilot light. No part inside furnace or boiler. No gears. Moving parts run in oil. Tested and listed as standard by Underwriters' Laboratories. One of the fastest selling oil burners on the market. New deferred payment plan doubling sales for present dealers.
A few territories still open to men who can qualify. Write today for full information.

Williams Oilomatic Heating Corp.
Main Office and Plant
BLOOMINGTON, ILL.
Branches in all leading cities.

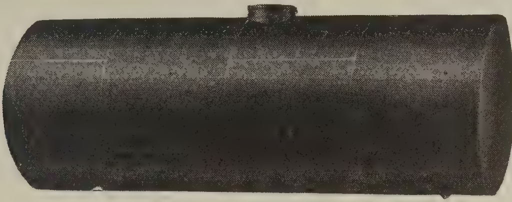
WILLIAMS
OIL-O-MATIC
HEATING

U. S. Petroleum Refining Capacity Increases

The indicated daily capacity of the petroleum refineries in the United States, including those building, is 2,832,532 barrels (42 U. S. Gallons) of oil, according to a compilation made for the Department of the Interior by G. R. Hopkins, petroleum economist of the Bureau of Mines. This figure compares with an indicated daily capacity of 1,186,155 barrels on January 1, 1918, representing an increase of nearly 138 per cent in refining capacity within the past 7 years. Another evidence of the recent tremendous increase in petroleum refining operations is the fact that there are at present 547 oil refineries in the country as compared with but 176 refineries listed as of January 1, 1914. The bulk of the increase in refinery capacity is due, however, to the enlargement of old refineries rather than to the building of new plants, the Bureau of Mines points out. Eight new refineries are now in course of construction.

New York City Board Approves Burners

Three more oil burners have been approved by the New York City Board of Standards and Appeals. They are the Dahl, submitted by the Bethlehem Ship Building Corporation, Ltd.; the Ray Rotary, submitted by the Preferred Utilities Company; and the Ballard, presented by the Ballard Oil Equipment Company.



Butler Built Tanks

are everything that fuel oil storage tanks should be. In galvanized or black steel, 10, 12 or 14 gage, and eight sizes, from 550 to 3155 gallons capacity, they offer a wide variety to choose from. ***Their durability justifies every purchase.***

Bottoms of all Butler tanks are re-inforced with copper-steel, a rust-resisting alloy five times more durable than ordinary steel.

"Fuel Oil Tanks for Oil Burning Equipment" is a booklet that we have published. It is most complete and will answer every question you could ask about tanks or their installation. Write for it today.

Two conveniently located plants make for prompt shipments of tanks.

Butler Manufacturing Company

Kansas City, Mo. **Minneapolis, Minn.**

Fuel Oil Markets

Distillate Demand Continues Strong —Prices Rise

BOTH furnace oils and fuel oil for heavy duty were continuing on their upward course in price as the month rounded the half way point, with no sign of weakness for some time to come.

No Change to Coal

The underlying strength of the market, unexpected by all but a few in both the buying and selling sides, has disregarded the alleged threat which was supposed to be held over its head by many large users—which was to the effect that beyond a point of $1.25, they would drop fuel oil and change again to coal. It is, of course, true that this threat has been made good in a number of instances, but with the price of fuel oil at $1.35 to $1.40, and a tendency to strength rather than weakness, there was nothing to indicate that the return to coal had been anything considerable.

Of course, many of the large fuel takers are being supplied on contract carrying prices not much above $1.15. But some of the really large concerns are buying at the present market.

The fuel oil and distillate market for the last three months has been pretty strictly a sellers' market, and the fuel oil division of it has been strong all along, with the distillate business more streaky. Even now, distillates are strong and steady, having recently passed a period when the demand surpassed normal bounds. Such a phenomenal demand as that which the distillate business experienced around the first of the year will help the oil and oil burner industries to become more closely attuned, and the lesson of preparing for eventualities will be emphasized, but such things are quite trying to all concerned, considering the comparative youth of the distillate business for the domestic burner. Oil jobbers in some instances were swamped with business of such proportions in the New Year demand that complaint was made that they lost much business through sheer lack of being able to take care of it. Not one authenticated instance has been found, however, where a user of furnace oi was absolutely unable to get oil from any source.

Distillate Quiet

Prices on distillate around the middle of the month ranged for the 36-28 gravity 3⅞ to 4 and for the 38-40, 4 to 4¼ cents.

OIL
BURN OIL THE MODERN FUEL
AMERICAN ASSOCIATION OF OIL BURNER MANUFACTURERS

Five Years From Now!

This insignia is the hall-mark of those burner manufacturers and auxiliary equipment manufacturers who believe in building for the splendid future of the oil burner industry. These firms give of their time and money for the upbuilding of the industry to the end that it may grow and prosper.

If you are the manufacturer of a burner, or of burner equipment, and expect to be in business five years hence, a membership will prove an inexpensive form of industrial insurance.

Membership application blanks may be secured on request. Write for details.

American Association of Oil Burner Manufacturers

350 Madison Ave. New York City

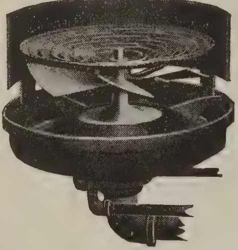
Second Annual Convention and Exposition, Edgewater Beach Hotel, April 1, 2, 3. Reduced fare on all railroads. Write for information about exhibit space.

Gas oil finally was participating in the strength of the whole line of oils for fuel purposes, and it was quoted in some cases around 3⅞ cents. In numerous cases it has been used for blending purposes to form a useable fuel for other purposes. Even kerosene has been notably strong, and in some cases 41-43 kerosene has been sold and used for high gravity distillate purposes, but this was not representative. Kerosene is quoted around 4⅝ to 4¾ cents a gallon.

Present Demand Greatest

The shift of the market from a situation in which buyers thought to hold back orders and force prices down into a position where supplies have become relatively scarce, has been strengthened by the greater demand for oils for burning this year than ever before, record consumption eating into stocks in spite of increased refinery runs. Domestic oil burners estimated between 250,000 and 300,000 in number are in use—more than ever before—while on the industrial side of the picture, railroads and other important users of fuel oil are taking more than hitherto. Events such as the recent coal teamsters' strike in Chicago, even though that was blocked almost before it started, are doing nothing to stem the rising tide of oils burned for domestic heating.

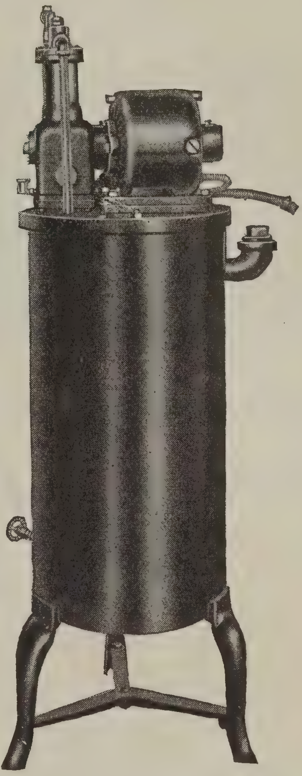
The Gulf Coast fuel oil market the latter part of January was extremely strong, bunker fuel being sold at Galveston at $1.70 f. o. b. ship. No contracts were being accepted by suppliers excepting at market price on date of delivery which merely insured the source of



The Rotary Oil Burner

is designed for use in steam and hot water heating systems, hot air furnaces, water heaters, ranges, etc. It produces maximum furnace efficiency by vaporizing the oil and mixing the oil-gas with the proper amount of oxygen, at the point of combustion. Uses fuel distillate of 27 to 36 gravity.

ROTARY MANUFACTURING COMPANY
1526 Santa Fe Avenue **Los Angeles, Calif.**
Eastern Manufacturer, 1934 Market St., Philadelphia, Penn.
Established 1908 **Handled by distributors**
Chicago, St. Louis, San Francisco, Oakland and others.



An Oil Pump that KnowsNoFailure

Repairs, trouble-shooting, or adjustments are not needed when a

Monroe Pump

is installed. They save many times their cost in service calls.

Write for our new circular, which has full descriptions of our new Double-Acting Float Switch, that eliminates any overflow line to the storage tank.

MONROE MACHINE TOOL CO.

737 W. Jackson Blvd.
Chicago

supply as purchaser had to pay the market. Quite a number of suppliers are refusing to quote at all on this grade of fuel.

Luling crude was selling at $1.25 to $1.30 at Luling and Gulf Coast fuel was bringing anywhere from $1.75 to $2 f. o. b. tank cars, Houston.

Smackover Steady

Smackover was being offered at $1.15 to $1.20 f. o. b. Smackover, which delivered on the coast brought the price to $1.70 to $1.75.

Mexican oil was quoted at from $1.30 to $1.40 Tampico ex tax, which made delivery price to the Gulf Coast $1.65 to $1.75 cargo lots. However, this was merely a quotation and there was none for sale.

The following prices in tank car lots, f.o.b. Group 3 refineries or adjusted to that basis, were quoted as of January 15, shipment in sellers' tanks:

Fuel oil, 24-26 gravity, per barrel	$1.35	$1.40
Fuel oil, 26-28 gravity. per barrel		1.45
Fuel oil, Smackover, per barrel		1.30
Gas oil, 32-36 gravity, per gal.	.03¾	.03⅞
Distillate, 36-38 gravity, per gal.........	.03⅞	.04
Distillate, 38-40 gravity, per gal.........	.04	.04¼
Kerosene, 41-43 gravity, per gal.........	.04⅝	.04¾
Kerosene, 42-44 gravity, per gal.........	.04¾	.04⅞

Improved Rotary Type 22

This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—And Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

Main Office and Factory

S. T. Johnson Co., Oakland, Calif.

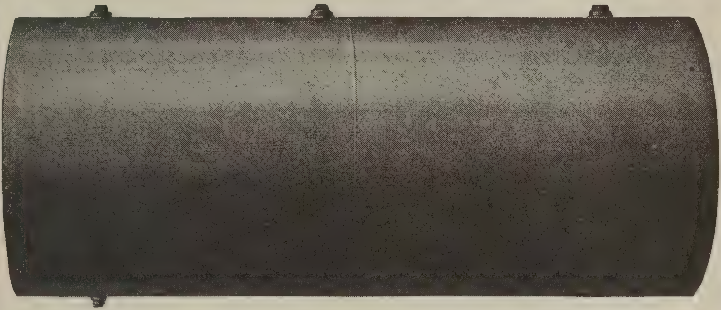
Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Paterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.

Write For

Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.

TRADE Leader MARK



The Logical Tank

For the Dealer Who Cares

If the burner is right and the tank is right then every installation will render quiet testimony to the integrity of the dealer who installed it.

Leader builds and guarantees quality tanks for every burner need. Of the thousands of tanks shipped out for burner use not one has ever come back.

Measuring gauges, vents, fill pipes, etc., are a part of our complete line.

Your order will be shipped immediately from stock.

Send for Special Bulletin and Price List No. 11

LEADER IRON WORKS, *Decatur, Illinois*
2118 N. JASPER ST.

Fuel Oil Production Continues Rise in November

Production of gas and fuel oils in the United States during November of 1924 totalled 1,134,146,744 gallons, a daily average of 37,800,000 gallons, according to the statistics of the Bureau of Mines. This was an increase in daily production of more than 400,000 gallons over the previous month. Judging by the reports from the different fields, this increase will be shown in the next reports to have continued during December. Total production for the month of November of 1923 amounted to but 1,057,931,617 gallons, which was an increase over October that year.

Exports dropped from a total of 134,983,365 gallons for October of 1924 to 123,965,901 gallons for November. This was in keeping with the raised export prices, but in direct contrast to what might have been expected from the decrease in domestic consumption, which dropped from 1,096,119,963 gallons in October to 1,012,943,344 gallons in November. The decrease, however, amounted to little over one day's consumption and, October being one day the longer, was not extraordinary.

In keeping with the lessened exports and domestic demand, the stocks at the end of the month had increased more than 30,000,000 gallons over the figure on November 1, and totalled 1,641,089,969 gallons. This figure would likely had been much higher had the imports not dwindled from 41,137,171 gallons in October to 32,266,576 gallons in November. Stocks on hand on No-

Known
The Wide World Over
and
on the Seven Seas

RAY BURNER
TRADEMARK

10,000 Ray Burners
Now Operating In
All Parts of the World

A Mechanical Masterpiece
That

Burns Cheapest Grades of Fuel Oils

Made in over 30 Different Sizes and Types

See Our New Baby Burner For Homes

In Full or Semi-Automatic Types

DISTRIBUTORS AT

Boston
New York
Philadelphia
Baltimore
Washington
Atlanta
Jacksonville
Providence
Hartford
Bridgeport
Cleveland
Detroit
New Orleans
Kansas City
St. Louis
Omaha
Dallas
Houston
Des Moines
El Paso
Minneapolis
Great Falls
Seattle
Portland
Chicago
Vancouver
Toronto
Los Angeles
Sioux City
Mexico City

W. S. RAY MANUFACTURING CO.

722 So. Michigan Ave., Chicago

120 New Montgomery St.,
San Francisco, Cal.

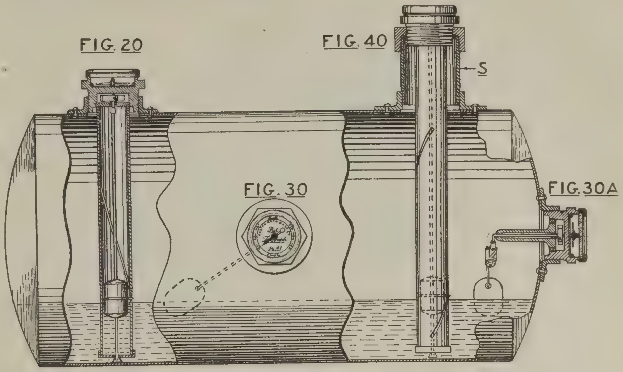


Fig. 20. Triumph No. 26 O. B. Upright gage, shown in section.

Fig. 30. Triumph Jr., No. 41 gage, applied to side of tank.

Fig. 40. Adaption of Triumph No. 26 O. B. gage for storage tanks buried underground.

Fig. 30A, Triumph Jr., No. 41 gage shown in section, applied to dome end of tank.

"Triumph"

Magnetic Oil Tank Gages
are
Durable -- Dependable -- Safe

The indicating pointer on all models of the "Triumph" is a compass needle which is revolved by the turning of a magnet under a solid diaphragm. This makes the gage absolutely safe for use below the level of the fluid, for even if the glass becomes broken there is no opportunity for either the fluid or fumes to escape.

An actual test by the Underwriters' Laboratories showed that a pressure of 1500 *pounds was necessary to cause a rupture of the diaphragm.*

Eighteen years of gage manufacturing experience have gone into the perfection of this gage.

Write for details of Model Jr. No. 41 and Model 26 O.B. which are special designs for oil burning equipment and are listed as standard by the Underwriters' Laboratories.

Boston Auto Gage Company
248 Boylston Street **Boston, Mass.**

vember 30, 1923, were 1,499,925,521 gallons, several millions under the figure for November 30, 1924, and the domestic demand for November of 1923 was but 918,644,119 gallons, nearly 95 millions less than the total for November of 1924.

The increase in production during November was due to the unusual activity in the Mid-Continent and California fields, where the number of producing well completions took a sharp upward trend. Decreases in imports are explained by the corresponding decrease in Mexican production.

Power Plant Fuel Consumption Drops In November

Daily average consumption of fuel oil by electric public-utility power plants in the United States during November of 1924 amounted to 38,100 barrels, according to a report issued by the Geological Survey. This compares with a daily average consumption of 45,300 barrels during the previous month and a daily average of 46,100 barrels during November of 1923.

Kirkwood and Wharton, of San Antonio, Tex., have reported the installation of an oil burning heating system in the Main Avenue High School of that city, and in the new central fire department station that is being erected there.

Heald Burner Company, capital $50,000, has been incorporated by L. A. Heald, J. C. Heald and Z. E. Eversole to manufacture and distribute a line of oil burning equipment. Headquarters are at Tulsa, Oklahoma.

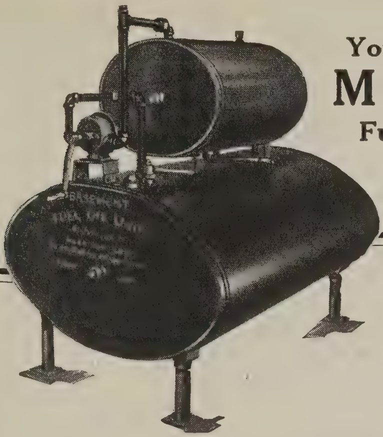
Coastal Water Pollution By Oil Investigated

An investigation of the pollution of coast waters of the United States through the steadily growing use of oil fuel for steamships, the increasing transportation of oil in tankers, and the extensive use of petroleum oils for many land industries is described and the results tabulated in a report recently issued by the Bureau of Mines of the Department of the Interior. While the investigation was general and the report only touches on the high points of the subject, the investigators seem to divide the greatest blame for pollution between oil tankers and oil burning vessels.

Give Information On Superior Unit

A circular has been sent out by the Superior Pump Company, Detroit, Mich., describing the Superior Compression Unit, type BN, which is made especially for oil domestic burner use. This unit is carried in several different capacities, adequate to be used with any size of oil burner now on the market. The design of the pump includes a large stuffing box using packing to retain the oil. The lubrication is of a special force feed design, made especially for use in the Superior Compression Unit.

The Automatic Gas Oil Burner Company, Chicago, has issued a folder describing the company's burner. It is a natural feed, natural draft type of burner and is guaranteed for one year, according to the literature.



You'll know the
Morrison
Fuel Oil Tank
by the
Oval Shape

250 Gal. Tank Clears Basement Door

Insist on the genuine Morrison Bros. fuel oil tank assembly. You'll recognize it by the oval shaped supply tank. Specially designed to pass through basement door. Eliminates the cost, work and inaccessibility which results from placing the tank outside the house.

Above the 250-gal. supply tank is placed a 50-gal. auxiliary tank filled by hand piston pump. Small tank connects directly with burner. Assembled into a compact unit. Thoroughly safe. Famous "leakproof" tanks of heavy 14-gauge black galvanized steel.

Price complete, $120. Magnetic Gauge $5. Pumps $16. Write at once for literature.

Morrison Bros.
"OIL EQUIPMENT HEADQUARTERS"
Dubuque, Iowa

Permanent Satisfactory Service

That is another one of the reasons why Chalmers Oil Burners enjoy the popularity they do today.

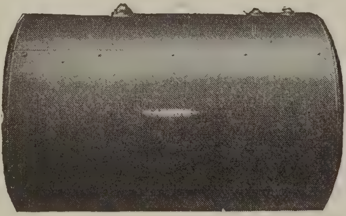
Every feature built up from standardized units, and backed up by our guarantee, Chalmers Oil Burners have earned a reputation that no amount of money could buy.

To become affiliated with this organization as a Chalmers Agent, offers a substantial profitable proposition to the right man.

Correspondence with substantial parties looking to permanent affiliations is solicited.

Chalmers Oil Burner Co.
Minneapolis :: Minnesota
Member of American Association of Oil Burner Manufacturers

»ARROW»
Unconditionally *Guaranteed* Oil Storage Tanks



The Novelty Steam Boiler Works Co.
929 S. Howard St. BALTIMORE, MD.

PRINCIPLES OF AUTOMATIC BURNER IGNITION AND CONTROL

(Continued from page 22)

upon the customer's psychology. So it becomes the duty of the ignition control apparatus to economize in gas expense. Either the gas flow should be maintained at relatively large proportions during the entire combustion event, or else it is reduced to a small flow a short time after the oil burner has been started. In either case the gas flame is of very small size when the burner is shut down, only large enough, in fact, to prevent its extinguishment by drafts or by diminutions in the service gas pressure.

Consumption Reduction

In burners using a fixed flame, the gas consumption must be reduced as much as possible for the sake of economy. Pressure atomization helps to make possible a small fixed flame. Another scheme is to close any natural draft through the fire box when the burner is inoperative, using the pilot flame to hold the combustion parts warm, so that the vapor, when it is discharged thereinto, will receive a certain amount of preheat before it is called upon to respond to ignition.

In burner systems making use of electric ignition, the spark may be allowed to play all during the combustion period, or it may be interrupted a short time after the burner has been started. In some systems an effort is made to prolong the period of application of the full kindling means until the actual propagation of flame in the firebox arrests the ignition automatically.

"About three years ago, we tested out some Ohio motors, hoping that difficulties which we were experiencing with another motor might be obviated.

As a result of the performance of your motor on test, we put a number of your motors in actual service. The service rendered substantiated the test results.

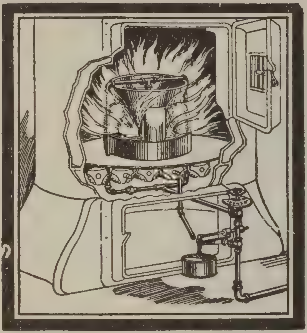
We have used Ohio motors now for approximately three years. We think more of the Ohio motors today than we did three years ago.

The above statements, taken from a recent letter of Mr. P. S. Russel, Vice President of the Home Appliance Corporation, are typical of Ohio motor users. They fully substantiate the one fundamental basis on which Ohio motors are designed and built, namely,—*reliable, sales-building motor service.*

A trial motor at your disposal

The Ohio Electric and Controller Co.

5920 Maurice Avenue
Cleveland, Ohio.



2800 Worthington Burners in Kansas City alone.

Seventh successful season. More reputable dealers wanted.

Write today.

Worthington Oil Burner Co.
1322 McGee, Kansas City, Mo.

Danger!

Water is a dangerous thing to have in your fuel oil tank in the winter. Besides lowering the efficiency of the burner, it is liable to freeze and spread the seams or clog the pipes and pumps. Examine your tanks with the

Oil News
Water Detector

It is a weighted brass rule upon which is fastened special detector paper. The rule is lowered into the tank, to the bottom, and the paper, which changes color when it strikes water, indicates the presence and depth of any water there.

PRICE $1.00

Supply of Detector Paper sent with each Detector.

Fuel Oil
for Heat and Power
350 Madison Ave. New York City

This division of oil burner design is usually cared for by the makers of control apparatus. It is indeed surprising what can be accomplished even with standard apparatus in devising circuits which will achieve what the oil burner designer wishes his controls to accomplish.

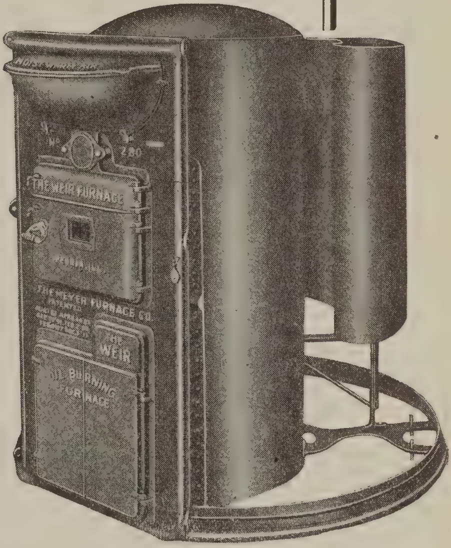
But as important as any branch of the entire problem is the provision for safety in case the burner should fail to ignite. Not only must a flood of oil be guarded against, but it must be certain that there shall be no possibility of those "puffs" which attended some of the earlier installations. These were due principally to delayed ignition, which allowed the fire box to fill with vapor before the flame was initiated.

Trip Switch Commonest

The commonest form of ignition safety is the familiar trip mechanism. This operates a switch or a valve or both and is energized by a float or a bucket. In either case the unconsumed oil is impounded and allowed to flow outwardly of the burner through a pipe or similar take-off, finally becoming available in one way or another to operate the trip mechanism. Such a device should be carefully designed to protect its usefulness against those who would witlessly remove any of the actuating parts or block them in such a way that they are rendered impotent

The pilot thermal switch, another device, opens the circuit of the motor driving the oil pump in the event of an ignition failure. It is assumed that the burner will always kindle provided the pilot is burning.

The WEIR
Oil-Burning Furnace



Endorsed by
leading
oil burner
manufacturers
and dealers
the country
over

*Get the Facts. Write
for information*

The Meyer Furnace Company
Peoria, Illinois

Books

of special significance to anyone interested in oil burning.

Burning Liquid Fuel
By William Newton Best
$4.00

A practical treatise on perfect combustion of oils, giving analyses, calorific values and heating temperatures of various gravities with information on design and proper installation of equipment for all classes of service.

Fuel Oil and Steam Engineering
By Robert Sibley and C. H. Delany
$5.00

An unusually complete treatment of fuel oil, for the central station man, the power plant operator, the mechanical engineer and the student.

Oil Fuel for Steam Boilers
By Rufus T. Strohm
$2.00

Describing the principles that underlie the use of oil as a fuel in steam boiler practise; the form and action of various types of burners; arrangement of furnaces for burning oil under different kinds of boilers; the operation of accessories such as pumps, heaters and cleaning devices; the methods of storing oil.

Industrial Uses of Fuel Oil
By F. B. Dunn
$3.00

Practical exposition of the use of fuel oil for industrial purposes, giving much specific information gotten through first hand experience.

Liquid Fuel and Its Apparatus
By William H. Booth
$4.00

Descriptions of various systems and apparatus; information on petroleum production and handling; and explanations of combustion principles and theories.

Prompt Attention Is Given to All Orders.

Check should accompany order.

FUEL OIL
for Heat and Power
350 Madison Ave. New York City

A still more novel departure is the stack-safety circuit, including a thermostat located in the smoke-stack and operated by the rise and fall in temperature of the stack gases. This thermostat interrupts the trend of a timing device, which piece of apparatus is set to interrupt the motor circuit a short time after the motor has been started. Upon the initiation of the starting sequence, there ensues a race between the stack thermostat and the timing device or "slow switch," as it is sometimes called. Should the flame be properly kindled, the stack thermostat on being warmed by the increase of temperature of the stack gases, halts the trend of the slow switch. But should the burner fail to ignite its vapor, the slow switch is allowed to complete its travel and stop the burner.

These controls and safeties are available from a number of control manufacturers and may be obtained in low or high voltage types and with open contacts or with mercury switches. From standard parts it is possible for the experimenter to assemble almost any circuit he may require. Eventually a standard method of protecting against ignition failure may be agreed upon. Until that time we are all working toward a common end.

Austin Fales, Sr., of Newark, N. J., formerly Newark representative for the Ballard Heat Equipment Company, has taken on the distributorships for several New Jersey counties for the Kleen Heet burner, manufactured by the Winslow Boiler and Engineering Company, Chicago, Ill.

Every Graver Tank is Pressure-tested

Cut Your Tank Costs

Buying Graver Tanks in carload lots will materially reduce your tank costs. The exceptionally attractive prices for single Graver Tanks—made possible through a huge standardized production—can be substantially reduced on carload orders. Only from 10 to 14 tanks are needed to make a carload.

In addition, freight rates per tank, on carload shipments are from 40% to 60% less those on L.C.L. shipments.

Graver lap welded seams, flanged inverted heads, and the use of only "Class A Structural Quality Steel" assure a durability that will keep your tank maintenance costs at an unusually low minimum.

These tanks are stocked in sizes of from 550 to 5000 gallons. A list of your requirements on a carload basis will bring you quotations that will show you how you can cut your tank costs.

GRAVER *Corporation*

(WM. GRAVER TANK WORKS - FOUNDED 1857)

Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment

160 Todd Avenue, East Chicago, Ind.
New York Chicago Tulsa Houston

NATIONAL AIROIL BURNER

Airoil Burners
"are efficient"

The Complete Design
and Installation of
Oil Burning Systems

**National
Airoil Burner Co.
916 Thompson Street
Philadelphia**

WE SPECIALIZE
IN
FUEL OILS
GAS OILS
FOR DOMESTIC OR
INDUSTRIAL PLANTS

DELIVERED EITHER IN
TANK TRUCKS OR
TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

OHIO REFINING COMPANY
TELEPHONE RIDGE 884
CINCINNATI, OHIO

THE DOMESTIC OIL BURNER—PAST, PRESENT AND FUTURE

(Continued from page 16)

or vapor, goes beyond the point where the ordinary control should operate. Such an ultimate safety device should require a hand re-set, and in the present condition of the industry should probably require that the service man be called. Fifth: For steam and vapor jobs a simple and effective automatic device should be provided to maintain the water level in the boiler.

It would be a great thing for the domestic oil burner industry if our leading engineering colleges would provide for instruction in home heating with oil. If this were done, young men would doubtless find their way from these colleges into the domestic oil burner industry and it would be good for the industry and good for the young man.

The year 1925 should mark the beginning of a more hearty co-operation between the oil burner manufacturer and the dealer, on one side, and the oil companies on the other.

The unattended oil burner in the American home is entitled to clean, uniform product and the oil companies of this country should bring their burning oils for home use to definite grades.

I believe that we have endured and passed through most of our growing pains and that the future will see refinement of design and an influx of trained engineers that will improve our technique and bring us to the point where every American home of the better class will have oil burners as a matter of course.

NOISELESS MOTOR

The users of Janette motors are protected by a source of special machinery and skilled operators against the usual mishaps of the ordinary motor. Janette motors are dynamically balanced on a highly sensitive machine, assuring quiet running qualities, long life, and the sequence of a perfect bearing.

You are cordially invited to submit your motor problems to our engineers at no cost to you.

Janette Manufacturing Company
556-558 West Monroe Street
Chicago

PHILADELPHIA
439 REAL ESTATE
TRUST BUILDING

NEW YORK
SINGER BUILDING
149 BROADWAY

Janette Motors

Consulting Page

Q. Will you please advise if it is feasible to burn oil in malting plants? We understand that in plants of this kind the fuel is burned in a peculiar manner, there being no stack on the burner required. We are also advised that any fumes escaping in the combustion of oil would be fatal to its use for this purpose.—T.N.C., Winnipeg, Can.

Ans. We are not familiar with any special process for using oil fuel in malting plants. Some oil burners have been developed which attain combustion of such efficiency that it permits their using no stack. The Breese Engineering Corporation, Chicago, has developed one such burner.

Q. On page 28 of the October issue of FUEL OIL, in the Fuel Oil Market Department you use such items as this: "24-26 gravity." Shouldn't this be "24-26 Baume"? We appreciated your magazine very much and take turns carrying it back and forth in the street car where it is very convenient to read, not being as large as the other publications.—A.A.S., St. Louis, Mo.

Ans. In the oil industry the words "gravity" and "Baume" are used practically synomimously, although the proper manner to designate an oil is by its "Baume gravity," both these words making up the proper term. It is shortened to "gravity," which is easier to say. Some, however, use the first word of the term and designate oils as "24-26 Baume."

Baume gravity is difficult to explain because it is an arbitrary term and the values it covers in one instance can be found by certain formulas that would not be practicable in others. Oils are not classified according to their specific gravity because it varies according to their temperature, the "sp.g." being the weight of any oil as compared with an equal bulk of pure distilled water at 60 degrees F. This variance with the temperature is taken care of by measuring with a special hydrometer that indicates both the specific gravity and the temperature and combines the two in a special arbitrary value which we know as Baume gravity. Hence, when we say "gravity" we mean "Baume gravity" and by the latter we mean an arbitrary value which indicates the specific gravity of the oil with due regard for the temperature—a combination of both values.

Q. In looking over the January issue of FUEL OIL we note on Page 26 a quotation of the average price of fuel oil in the United States. This is given as $1.36 per barrel for November, 1924. On Page 70 of the same issue, tank car price is quoted at $1.25 per barrel for fuel oil of approximately the same grade we are using. We would like to have your explanation of the wide difference between these prices at the refinery and the delivered price at Greenfield, Mass., of approximately $6.50 per 100 gallons. Is the cost of transportation entirely responsible?—J.W.H., Greenfield, Mass.

Ans. The prices given on Page 26 were general averages for all grades of fuel and all fields in the United States for the month of November.

The prices quoted on Page 70 were those in effect at the Refinery in Group 3. The purchaser would have to pay the transportation costs. We do not know the freight rate from Group 3 into Greenfield, but it costs about 4.95 cents a gallon to bring a gallon of fuel oil from Group 3 into New York City. So if you are having a Mid-Continent fuel oil delivered to you for 6.5 cents a gallon, you are probably being treated fairly.

Q. Will you please give me the coefficient of expansion of fuel oil?—J. Mc.G., New Orleans, La.

Ans. This figure varies from .00036 to .00040. It is used to find the correct volume of fuel oil at a standard temperature. For example: a shipment of fuel oil might amount to 50,000 gallons when measured in a calibrated tank at 120 degrees F., but its true volume under standard conditions would be 50,000—(120-60) x .0004 x 50,000 equals 50,000 less 1,200 gallons or 48,800 gallons.

Q. Some time last spring a short item in FUEL OIL referred to a very efficient method that had been developed for converting fuel oil into a gas. The article gave no names, and I would like to know where I can get in touch with the man who developed this method.—E. I. W., Richmond, Va.

Ans. The item in question did not state that the process was "very efficient," but merely noted that it had been developed. At that time the process was being used and sold by the Orgascoe Company, Niagara Street, Buffalo, N. Y. We do not know whether or not the company is still in existence.

Gill

AUTOMATIC

Oil Burner

Sheer merit is the basic reason why heating engineers strongly recommend the Gill Automatic Oil Burner and why the Gill distributorship is most profitable.

Simple in construction—positive in operation, Gill Automatic Oil Burners give complete satisfaction.

You do not have to spend your profits servicing a Gill Burner.

Gill Manufacturing Co.
8300 South Chicago Ave.
Chicago, Illinois

Write for details of our selling franchise

Saving Them

WHEN a magazine champions a cause as aggressively and intelligently as FUEL OIL champions the cause of efficient oil burning and of the oil burner industry, each issue of that magazine is certain to be filled with new, interesting and vital information that the efficient and far-seeing member of the industry, as well as each individual owner of oil burning equipment, will save and file for future reference.

But a pile of copies on the corner of the desk is not a very efficient file, and even when they are placed on shelves they are liable to be damaged. So we have provided a safe way to save them with the

FUEL OIL BINDER

It is substantially finished in heavy black cloth and leather and is lettered in gold. It holds from one to twelve copies of the magazine and is made to easily permit the addition of a new copy each month. We offer it at cost—$1.40—check to accompany order.

The value of copies of FUEL OIL mounts rapidly with age. Be sure you save yours. A check in the mail today makes it an easy process.

FUEL OIL

For Heat and Power

350 Madison Avenue
New York, N. Y.

20 East Jackson Blvd.
Chicago, Ill.

THE PROBLEM OF THE OIL BURNER MANUFACTURER

(Continued from page 14)

the over-enthusiastic statements of the Oil Burner Salesman to his prospective customer. There is no magic about an Oil Burner that will convert a defective heating plant into a good one, but the Oil Burner Salesman thinks there is, and he makes many rash promises to his prospective customer. And, unless the agent checks him up pretty well, trouble brews quickly. There are also some grades of oil that will not burn satisfactorily in small oil burners, but the Oil Burner Salesman will not admit it, and many an oil distributor can tell you of the trouble he has had pumping a supply of perfectly good oil for other purposes, out of a householder's tank after the Oil Burner Salesman has told him that "cheap oil" is the thing for him to use.

Bad Competitor a Problem

(2) The Oil Burner Manufacturer has also a very real problem in the other Oil Burner Manufacturer. There are some really good oil burning machines on the market, but many of the opposite stripe. And somehow, the man with a so-called Oil Burner of no practical value frequently makes sufficient headway in selling his equipment to place the whole Oil Burning Industry in bad repute in the community and almost preclude the subsequent sale of satisfactory burners.

Besides which it seems to be the custom of some Oil Burner Manufacturers to thoroughly inform their distributors and salesmen of the weak points of other really good Oil Burners, thereby giving out the impression that all are alike possessed of so many weak points that it would be well for the prospective customer to wait until the industry in general arrives at a more advanced stage of development. This last trouble may perhaps be ameliorated when local associations of Oil Burner Dealers begin to function more satisfactorily and a friendly feeling is engendered among those engaged in the industry.

Must Find New Customers

(3) Not least among the problems of the Oil Burner Manufacturer is the method of securing his customers. His prospective customers are as numerus in some localities as the houses in the community. If his show room is located on a much frequented thoroughfare, he will have so many callers out of idle curiosity that he will find it difficult to recognize the grain of wheat in the proverbial bushel of chaff.

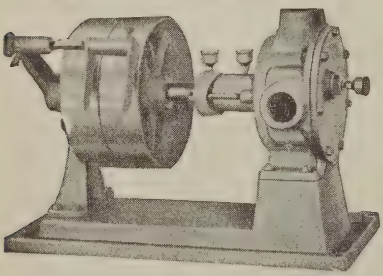
He will find it necessary to keep several demonstrators continually showing his apparatus to these casual callers, thereby preventing them from doing more productive sales work. If his place of business is not located in a convenient neighborhood he is very sure to miss some customers who would have taken advantage of a convenient moment to investigate the apparatus. It is well perhaps that the show rooms of the distributor should not be too conveniently located and yet should not be so far removed from the frequented thoroughfares that a person who has become interested would have to inconvenience himself to make his investigation.

Previous Knowledge Common

After demonstrating the oil burning machine to real prospect, the distributor generally finds that his prospective customer has previously known something of oil burning. That knowledge may or may not be favorable. He has probably known where some widely advertised oil burner has been installed and because of improper combustion has caused the owner of the machine expensive trouble of one kind or another.

The "news" has been industrially spread that an oil burner is likely to explode at any minute and blow the house up; that at any moment the house is likely to be sooted up and all the draperies and furniture ruined. All these stories must be counteracted before the customer is finally secured.

After the customer has been secured and the oil burning equipment installed, the customer seems to think that all he will have to do is to have the service man of the oil burner distributor light his pilot light in the early fall and the equipment will entirely take care of itself for the heating season. The well informed Oil Burner Manufacturer and his Distributor both know that it will be necessary for the burner to have continuous attention while it is in operation and the customer must be informed regarding this attention. All machinery with moving parts must be oiled and the oil burner is no exception. All furnaces need to be cleaned occasionally and the furnace that is burning



VIKING PUMPS

For Fuel Oil Burners

Strongly constructed on simplest lines, with only 2 moving parts, with powerful, positive suction—the VIKING Rotary Pump is particularly suited and widely used for fuel oil burners. Over 60,000 VIKINGS in use.

Viking Pump Co.
Cedar Falls, Iowa

Write to factory or nearest branch for copy of new catalog and prices.

B. F. Schirmer Co., Inc. - - - 342 Madison Ave., New York, N. Y.
Viking Pump Co. - - - - 549 W. Washington Blvd., Chicago, Ill.
Viking Pump Sales Co. - - - - 204 Grand Ave., Milwaukee, Wis.
Viking Pump Co. of Canada, Ltd. - - - - Walkerville, Ontario
Menge Pump & Mach. Co., Ltd. - 862 Tchoupitoulas St., New Orleans, La.
De Laval Pacific Co. - - - - - 61 Beale St., San Francisco, Cal.
Kerr Machinery Corp. - - - - - Kerr Building, Detroit, Mich.
Hayes Pump & Machinery Co. - - - - 94 Pearl St., Boston, Mass.
The Schirmer Co. - - - - 750 Prospect Avenue, Cleveland, Ohio
Southern Engine & Pump Co. - - - - - - - Houston, Texas
Power Equipment Co. - - - - - Oliver Building, Pittsburgh, Pa.
Walter H. Eagan & Co. - - - Stephen Girard Bldg, Philadelphia, Pa.
Walter O'Bannon Co. - - - - - 519-21 E. First St., Tulsa, Okla.
Norton Paper Goods Co. - - - 719 Delaware St., Kansas City, Mo.

Bird Oil Burner

Some Good Territory left for the right parties.

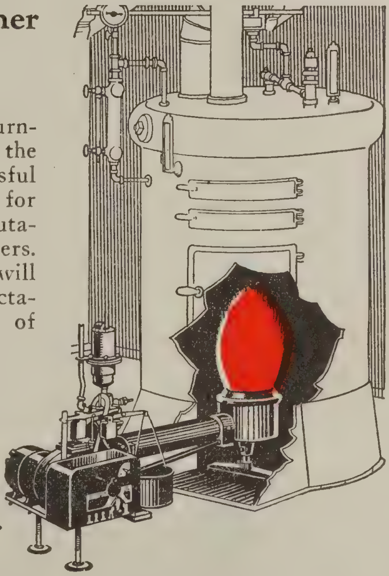
Three Years of Proven Success

A high class burner at a price one can afford.

Hundreds of Bird Burners are in use all over the country. Their successful operation has won for them an enviable reputation among home owners. It is a burner which will meet your every expectation, and assure you of satisfaction.

Write Today
For Information

BIRD
BURNER CO.
Minneapolis, Minn.



The Basel Valves and Heat Regulators

are now patented. Why? Because they are not just ordinary valves. They mean advanced theories in valves and valve control construction for Gravity and Mechanical burners.

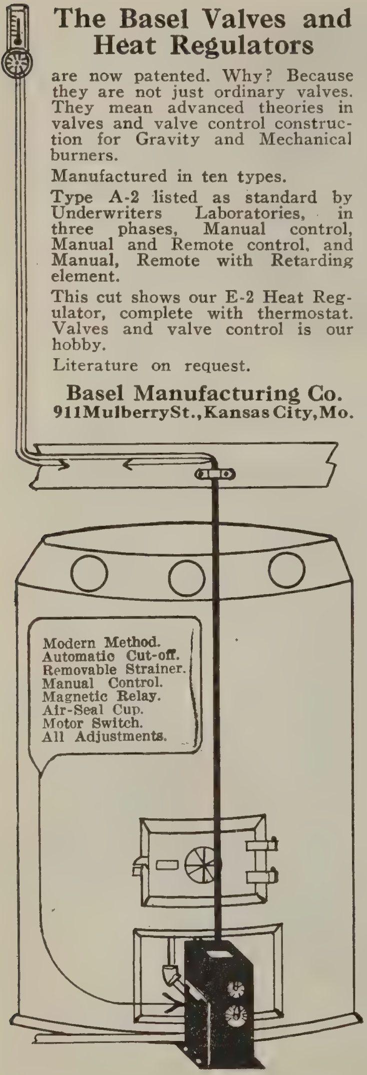
Manufactured in ten types.

Type A-2 listed as standard by Underwriters Laboratories, in three phases, Manual control, Manual and Remote control, and Manual, Remote with Retarding element.

This cut shows our E-2 Heat Regulator, complete with thermostat. Valves and valve control is our hobby.

Literature on request.

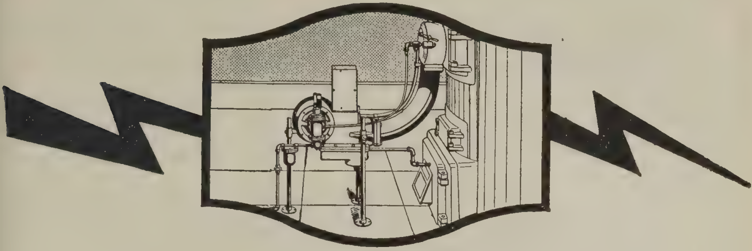
Basel Manufacturing Co.
911 Mulberry St., Kansas City, Mo.


Modern Method.
Automatic Cut-off.
Removable Strainer.
Manual Control.
Magnetic Relay.
Air-Seal Cup.
Motor Switch.
All Adjustments.

oil will be no exception. These things are hard to impress upon the man who is buying the oil burner. He feels that his oil burning machine should require no more attention than the gas range operated by the women-folks in the kitchen. So the education of the customer in the proper use of the oil burning machine becomes a really important part of the problem of the Oil Burner Manufacturer and one that he must recognize and provide for.

Oil Shortage "Bunk"

(4) Any discussion of the problem of the Oil Burner Manufacturer would be incomplete without reference to the oil distributor, whether he be jobber or refiner, and this is not because the Oil Burner Manufacturer has any difficulty in securing a grade of oil that is needed for the oil burning machine. In all of the larger communities a sufficient supply of satisfactory oil is readily secured. But the Oil Dealers, particularly some of the large refiners, will persist in spreading the doctrine of an eventual oil shortage. Why this old stuff should continue to be preached is beyond the limited comprehension of the Oil Burner Manufacturer. The prospective oil shortage has been the skeleton in the closet for many years, while as each year has rolled around the supply has grown larger and larger. Yet otherwise really progressive men in the oil business not only fail to take steps to counteract this propaganda of the coal men, but actually join in spreading the "information." It might naturally be supposed that after so many years of crying "wolf, wolf," and



The Truth About Electric Ignition

Electric spark plug ignition of oil for heating purposes was successfully achieved more than 15 years ago.

In June 1919, this principle was first applied to domestic oil burners. Its practicability was demonstrated in the winter which followed.

The development of electric ignition for oil heaters was carried out by the engineers who designed the Electrol Automatic Oil Burner. When false or misleading claims are made that electric ignition in oil burners has now been perfected or developed for the first time by any one, this can be characterized in only one way.

Yet these claims are natural enough. The price of pioneering is always imitation. The penalty of leadership is always the envy of those who only follow.

When false claims are made in advertising (as they have been made concerning the development of electric ignition for oil burners), we must remind you that "truth in advertising means honesty in product."

HOME APPLIANCE CORPORATION
2818 Locust Blvd. St. Louis, Mo.

The Electrol Automatic Oil Burner is the perfected oil burner with the added essential feature of entirely automatic electric ignition. Some desirable territory is still available. Write for particulars.

(Scott-Newcomb System)

ELECTROL

Electric Ignition Quiet Operation

AUTOMATIC OIL BURNER

YOUR CONTROL PROBLEMS

Solved and Service Calls Eliminated by Dependable, Long-Lived

CON-TAC-TOR **Mercury Controls**

High and Low Voltage Room Thermo Switches, Boiler Safeties, Time Limit Switches, Magnetic Valves, etc. A complete Automatic Line.

ABSOLUTE CON-TAC-TOR CORPORATION
BELOIT, WISCONSIN

Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers". It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York

Branch Offices in the Larger Cities

actually thinking they saw the wolf coming, that they would turn the chair around and let the light come over the other shoulder, so that they might read aright the signs of the industry.

Oil Men at Fault

Only so recently as the November meeting of the National Petroleum Marketers Association, one of the best known oil men of the country repeated this same old story. If it had been brought up for consideration in the private councils of the industry it would have been a proper subject for discussion, but the writer bought a copy of the New York *Herald-Tribune* in Montreal, Canada, and there on the front page was a newspaper report saying in about ten lines that this captain of industry prophesied that the oil supply would be exhausted in a period of a very few years. How can the oil burner manufacturer and his distributor be expected to face prospective customers and make sales of oil burners when so able a man, generally speaking, indiscriminately circulates a report of an oil shortage. It is a rather interesting commentary on this particular address, that in one of the most reliable trade journals of the oil industry, the address was printed in full on one side of the page and the able editor made this interesting remark on the opposite side of the same page:

"There is at least one answer which can be known only to Omniscience, the estimated quantity of oil and gas recoverable from the unproved productive oil and gas lands held December 31, 1923.

A Standard Size for Every Oil Burner
Known Everywhere for Their Quality

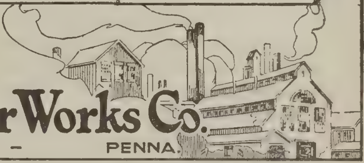
Established 1860 Incorporated 1907

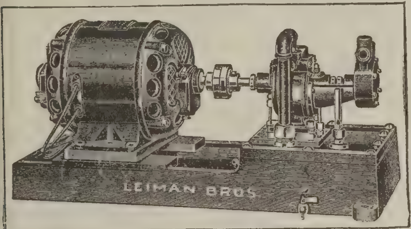
SHARPSVILLE TANKS

65 TO 30,000 GALLONS
HORIZONTAL & VERTICAL

MANUFACTURERS OF
OIL EQUIPMENT

Sharpsville Boiler Works Co.
SHARPSVILLE, - - - PENNA.



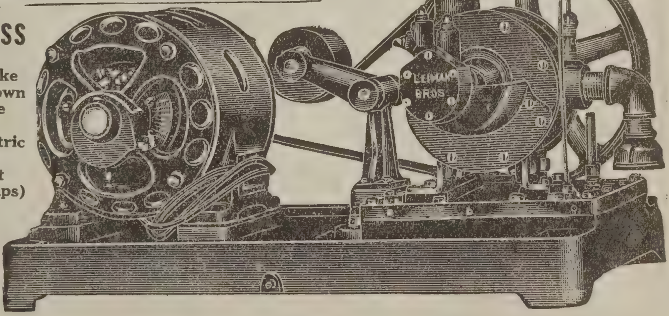


Leiman Bros. Oil and Air Units with self lubricating oil device. Both coupled and belted units in large and small sizes. Oil delivered to burner without fluctuation and atomized by the air supply.

Leiman Bros., 60 Lispenard St., New York
Makers of good machinery for 35 years

Steady and Reliable

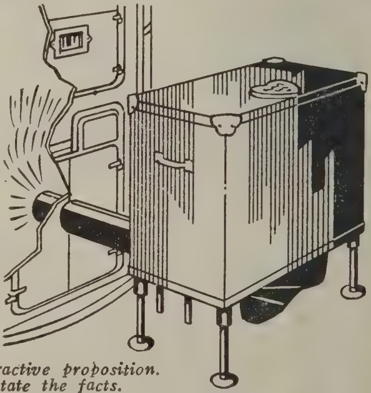
Noiseless
The air pumps take up their own wear. The oil pumps are eccentric positive drive (not gear pumps) We also have oil control valves pilot control and strainers.



"The best qualified men in the world have made repeated efforts to estimate the recoverable oil reserves only to find their estimates made ridiculous by actual development."

Those of us who have been in the business of manufacturing and selling oil burners for considerable periods are well aware that there has not been one single moment of time when a coming oil famine has not been industriously preached by the oil industry. At the meeting of the American Petroleum Institute in St. Louis, last year, this matter was talked of and from the nature of the papers read and the discussions that followed, it was to be hoped that this kind of talk, outside of the most secret councils of the industry, would stop. There is no one thing that the oil burner manufacturer faces today that is a more serious feature of his problem than convincing his prospective customers that they will be able to get oil, and that these men who talk about the shortage have their noses so close to the grindstone that they cannot grasp the larger vision.

But, after all, the problem of the Oil Burner Manufacturer, while very real, is no more than is to be expected in the development of an industry that has come so quickly and is growing so rapidly. We welcome the cooperation of all who are engaged in the petroleum industry, and we assure you that oil burners are rapidly progressing to such mechanical perfection, that the number of oil burner equipments to be installed will only be limited by the available oil supply and the number of dwelling houses.



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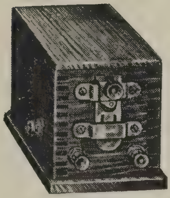

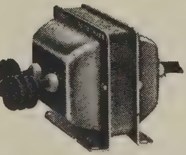

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THE EFFECT OF FURNACE TEMPERATURE ON BOILER EFFICIENCY

(Continued from page 11)

Also the speed of the gases passing over the water heating surface has been retarded, allowing the boiler more time to absorb the heat; the furnace is hotter, and if the boiler is in a good physical condition to absorb more heat the greater transfer will mean higher efficiency.

Proper Mixture Necessary

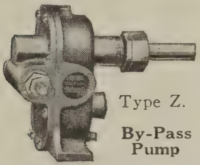
The reason the temperature of the furnace has been increased may be explained in this way—suppose, for example, we take a pound of oil containing 18,000 B. t. u. In order to get the oil to give up all its heat it must be mixed with the proper quantity of air to produce perfect combustion. This would represent the maximum temperature. Now suppose there were no losses to the outside or any heating surface in the dutch oven where we will think of this pound of oil as being burned. The temperature reached by combustion, therefore, will depend on the amount of excess air present. It must also be remembered that where CO (unconsumed carbon) is indicated, the furnace temperature will drop. This is due to insufficient air being supplied to produce perfect combustion. This condition is not only costly in the wastefullness of fuel but it is detrimental to the boiler.

Another method of determining furnace temperature, which is accurate and more definite is the actual measurement of the furnace

Oberdorfer Pumps

AN Oberdorfer Bronze Pump (Type Z) will carry any given quantity of fuel oil to the combustion chamber. A simple gauge sets the metering and thermostatic control regulates the release of fuel when needed.

A By-Pass within the pump eliminates the necessity of a separate fuel return line. Minimizes loss of fuel and guarantees efficiency.



Type Z.

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Oberdorfer Motor Driven Pumps are equipped with automatic float switch for controlling flow of fuel oil from reserve tank to supply tank.

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mounted on the wall wherever desired and at any distance from the tank, will give him this information.

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temperature. The highest furnace temperature for a given rating should be carried in a straight line. One of the methods used in obtaining an average temperature of the furnace gases is to pass them through a by-pass through the first pass baffle to the last passage of the boiler, and, to the large drop in pressure, the sample of flowing gas is drawn from all parts of the furnace and a temperature reading is obtained that represents an average relative temperature relation to the average temperature of the furnace. This temperature is usually obtained by the use of a base-metal thermo-electric couple located in the passage of the by-passed gas, and is out of the range of the radiant heat.

The temperature of the couple seldom gets above a temperature of 2000 degrees, so it has a fairly long life. This relation between the average furnace temperature and the temperature and observed in the by-pass is obtained by taking many readings over all parts of the furnace, obtaining the average and comparing with the average observed for the couple in the by-pass for the same time. This difference is usually from 800 to 1000 degrees and has to be obtained for each individual furnace. In connection with this system there is a recording temperature of the escaping gases. It is surprising what information these two readings can give. The formula

$$\frac{T_1 - T_2}{T_1} = \text{efficiency},$$

can be used to good advantage. Let $T_1 =$ furnace temperature, and $T_2 =$ the temperature of the exit gases.

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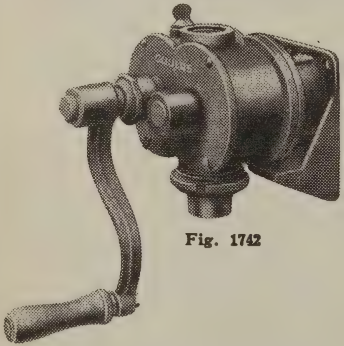

Fig. 1742

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Then, for example, if the furnace temperature was 2900 and the exit gases 510 degrees, the formula would read as follows:

$$\frac{2900 - 510}{2900} = 82.4\% \text{ boiler efficiency.}$$

It should be remembered that 82.4 per cent does not allow for fixed losses such as radiation loss which reduce the efficiency about 4 per cent more. Hence, instead of having 82.4 per cent, it would be 78.4 per cent.

If flue gas analysis are taken properly they have a direct bearing on furnace temperature, which produce a corresponding temperature for each CO_2.

At one of the largest public utility power plants in this country a series of tests were run which proved this. With a furnace temperature of 2900, the corresponding CO_2 was 15.4%; for 2730, a CO_2 of 14.3%; for 2680, a CO_2 of 13.7%. If the load is constant and the CO_2 and furnace temperature are high and remain so for the period of the same load conditions, and exit gases are gradually going up, it is time to investigate the physical condition of the heating surface. Keep in mind the following:

> Keep the excess air entering the furnace to a minimum without smoke. If the load varies keep your air supply in step with your oil supply. Watch your exit gas temperature closely. In other words maintain the highest furnace temperature possible for a given load and keep your exit gases as low as possible.

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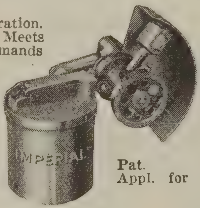

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Published Monthly

Vol. 3 March, 1925 No. 9

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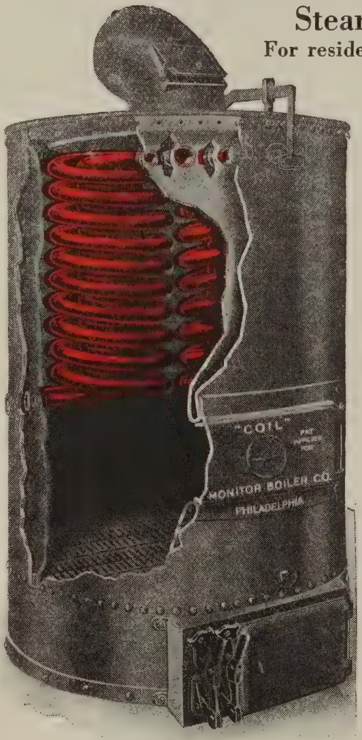

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FUEL OIL
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The Heating Value of Oil

By Gilbert Spencer

A PECULIAR characteristic of fuel oil, showing clearly in the accompanying table, is the way distillates hold their heat value, comparing in that respect with the crude oil from which they are obtained.

For example, crude oils vary in heat value from 18,820 B.t.u. per pound to as high as 19,500 B.t.u. per pound, Indiana crude being the lowest in heat value and California crude the highest. Fuel oil, on the other hand, averages 19,000 B.t.u. per pound, taking in the entire range of crudes. Pennsylvania crude averages 18,940 B.t.u. per pound, still, distillates from it, which range around 38 degrees to 44 degrees Baume will average considerably over 19,000 B.t.u. to the pound. Thus, 34 degrees Baume distillate, sold as furnace oil or fuel oil, contains 19,600 B.t.u., while 42 degrees Baume oil from the same source will run as high as 19,900 B.t.u. per pound.

The reason for this seeming paradox of a fuel oil rising in heat value higher than its base is due to the fact that there are other products of the crude, such as vaseline, paraffine and coke which are below the average of crude in heat values, so some of the fractions must be higher than the average to bring about the standard.

Actual Comparison Favorable

But it is by comparing the heat value of oil with that of other fuels that we get the best line on its worth. Turning first to the coals, for coal is the most widely and extensively used fuel of today, we will pick out for comparison bituminous coal, it having the highest heat value of all the coals.

Pocahontas coal is acknowledged the best steaming coal mined. This is due to its superior burning qualities as well as to its high heat value. The total heat of combustion from one pound of Pocahontas coal burned in a bomb calorimeter is 15,391 B.t.u. That is 4509 B.t.u. per pound less than the heat liberated by the combustion of one pound of 42 degrees Baume fuel oil. Stated in another way, one pound of oil of the gravity stated above is equal in heat or fuel value to approximately 1.3 pounds of Pocahontas coal.

When we shift the consideration from Pocahontas bituminous to an ordinary grade of bituminous, such as Illinois coal, the register drops to 10,506 B.t.u. per pound. At that heat value one pound of 42 degrees Baume oil is worth in heat value almost two pounds of coal, or to be specific, a trifle under 1.9 pounds of coal. Bituminous coal is used throughout perhaps two-thirds or three-fourths of the country. Anthracite, on the other hand, is used in the other one-quarter or one-third of the United States, particularly those States north of the Ohio and east of the Mississippi.

TABLE NO. I
Heat Values of Various Fuels

Kind of Fuel	B.t.u. per lb.	Lb. per gal.	B.t.u. per gal.
LIQUID FUELS			
Fuel oil (Residuum of Petroleum)	19,000	7.5	142,500
Beaumont crude	19,060	7.5	142,950
California crude	19,500	7.6	147,200
Lima crude	18,820	7.5	141,130
Pennsylvania crude	18,940	7.5	142,050
Kerosene	16,120	7.5	116,000
Oil tar	16,970	9.5	161,200
Coal tar	16,260	10.0	162,600
Denatured alcohol	13,141	5.7	74,900
SOLID FUELS			
Pocahontas coal	15,391		
Pittsburgh bituminous	12,141		
Illinois bituminous	10,506		
Anthracite	13,189		
Coke	13,000		

Anthracite coal has a heat content of 13,189. That is 6,711 B. t. u. less than a pound of oil, such as is used in domestic installations. In other words, 1 pound of oil possesses almost one-third more heat value than 1 pound of anthracite coal.

In speaking of the heat value of coal, 100 per cent coal is meant. When coal is being tested for its heat value in a calorimeter, all slate and other impurities are removed. The coal is hand picked, so that the percentage of ash is kept very low. In practice, on the other hand, coal must be fired in the boilers just as it is received from the coal dealers or the mines. The result is, a householder is fortunate, indeed, if the actual coal he receives runs above 75 per cent pure carbon. Suppose we assume that only 20 per cent of the coal delivered is slate and other impurities. That would give a net heat value of about 10,500 B.t.u., as against 19,600 B.t.u.

(*Continued on page* 80)

A. A. O. B. M. Convention Looms as Big Event of Year

By Arthur G. Winkler

INTEREST in the Second Annual Convention and Exposition of the American Association of Oil Burner Manufacturers, to be held at the Edgewater Beach Hotel, Chicago, April 1, 2 and 3, is rapidly growing, according to association officials, and an attendance even larger than the previously estimated 2,000 is now expected. Orders for exhibit space came in swiftly after the first anouncement of the time and place of the convention, and on February 15, one month and a half before the Convention date, 28 of the 35 booths in the exhibit hall had been reserved.

Program Varied

No definite program has yet been announced, but it is known that every phase of oil burning will be touched upon by the various papers and addresses. Our future oil supply, cooperation with the oil industry, burner installation, burner patents, flame and combustion theories, tank installation, burner and boiler operation and efficiencies are among the general subjects that will be covered.

Several prominent oil burner manufacturers will make reports on tests and experiments that they have been conducting during the past year on burner operation. Officers of the association who have attended conferences and meeting with representatives of oil men's associations and other similar organizations will make reports.

Group sessions will be held for the domestic burner men and for those interested chiefly in industrial burners, alternating with the general sessions, which will be of interest to both. Representatives of several allied industries, burner auxiliary equipment men, and various other non-members of the oil burner industry will have places on the program.

Entertainment Planned

J. W. Owens, of the Federal Gage Company, 564 West Adams Street, Chicago, who has been made chairman of the committee on arrangements, has announced that special attention will be given to the program of daily and evening entertainments for the wives of those in attendance. These will consist of theater parties, a reception and the annual banquet, which will probably be held on the evening of the last day of the meeting. A speaker of national prominence will deliver an address at the banquet. Election of officers for the coming year will be held on the second day.

The hotel management has made ample room reservations, and Leod D. Becker, secretary of the association has announced that reduced

(*Continued on page* 74)

Building Diesel Engine for Locomotives

The Baldwin Locomotive Company, in conjunction with Knudson Motor Company and the Westinghouse Electric Company, is building a Diesel engine which is said to have the necessary compactness and lightness of weight for use in locomotives. It was designed by Knudson and has but two cycles, and its first run, on Feb. 11, before its generator was installed, showed it to exceed 1250 revolutions per minute. When it is ready for its first road test, it is hoped that its fuel cost will be about one-fourth that of a coal steam locomotive of an equivalent size. Fuel consumption is estimated at 345 pounds of fuel per h.p. per hour.

Number of Oil Burning Vessels Grows Rapidly

The world's merchant shipping is definitely committed to oil as a fuel, as are the navies of all nationalities. This is in part attested by the growth of oil burning vessels since the outbreak of the World War. On June 30, 1914, there was a total of 501 vessels, aggregating 1,721,747 gross tons, exclusive of army, navy, admiralty and other government oil burners, using oil as fuel. By June 30, 1923, the world oil burners had increased to 3348, aggregating 16,478,104 tons. Oil burning vessels under American registry in 1914 totaled 656,364 gross tons, as compared with 556,743 tons under British registry and 164,871 tons under German registry. In 1923 the United States led in oil burning vessels by a large margin, the total tonnage being 9,017,213, compared with 4,271,167 tons for Britain. Notable increases in oil burning vessels are shown for Holland and Germany. Number of oil burner ships for all countries for the years 1914, 1922 and 1923 are given.

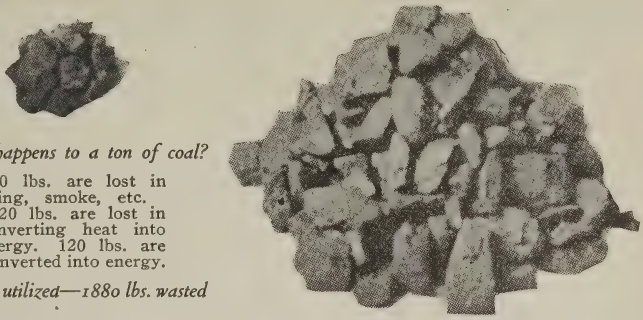
Wayne Making Burners

Expansion of the Wayne Tank and Pump Company, of Fort Wayne, Ind., to include the manufacture of domestic oil burners has resulted in the reorganization of the sales executive personnel, with W. G. Zahrt, formerly sales manager of the pump and tank division, becoming director of sales in charge of all divisions. R. G. Ewell will continue in charge of oil burner sales.

The company's plant will be enlarged and production of the burners will start on a large scale soon. Business done by this company during 1924 was the largest in its history, according to Mr. Zahrt.

Williams Booklet Elaborate

Elaborateness and clearness of presentation are the two chief features of a booklet, "New Facts About Oil Heating," that was published recently by the Williams Oil-O-Matic Heating Corporation, Bloomington, Ill. It is a complete history of the Williams organization and contains also a clear description of the burner itself, giving various illustrations of the correct manner of burning oil and installing the burner.



What happens to a ton of coal?

860 lbs. are lost in firing, smoke, etc. 1020 lbs. are lost in converting heat into energy. 120 lbs. are converted into energy.

120 lbs. utilized—1880 lbs. wasted

Diesel Plant vs. Steam Plant—Oil vs. Coal

STATISTICS show that the average power plant in this country is an installation of about 200 horsepower. Further, the statistics claim that this "average" power plant uses eight times the fuel per unit output as does the largest central stations. Clearly, then, the field for economy in power production lies in the small anl medium sized generating plant. It is in this field that Diesel power, with its lower installation cost, floor space required and extremely low fuel and maintenance cost, is shown at its greatest advantage.

One hundred and twenty pounds of coal of representative quality contains heat units equivalent to 660 horsepower hours. Even the large central station in utilizing the heat of this weight uses an additional 680 pounds from which no return is derived. This is a very poor showing considering the elaborate layout and costly equipment of the large station. However, the little steam plant presents a picture of far greater waste. With its poor load factor, as well as much less efficient equipment, throwing away heat through the stack, in the ash pit, through the steam pipes and in the engine, it wastes 1880 pounds of coal for every 120 pounds actually utilized. The ratio of waste to utilization is very nearly 16 to 1.

Waste Is Immense

On a dollars and cents basis, the exorbitancy of this waste is best emphasized; for every $10 that the municipal or industrial average or near average plant invests in coal, but 60 cents' worth is turned into electrical or mechanical energy. Sixty cents' worth utilized, $9.40 worth thrown away—wasted.

The waste of 1880 pounds of coal

for every 120 pounds actually utilized, gives the average steam plant an overall efficiency of less than 6 per cent. This measure is made from the coal pile to the bus bar. To refer to engine efficiency is not a fair or accurate measure of the performance of the steam plant. Conversely, when the efficiency of the Diesel engine is noted as being 30 to 33 per cent, it is on the same scale as the "coal pile—bus bar" measure, for the Diesel engine is a power unit complete within itself, and in the single unit the heat energy of the fuel is transformed into electrical or mechanical energy at the generator or pulley. There are no power consuming auxiliaries in the Diesel plant. The long line of energy transformation of the steam plant with its inherent losses that cannot be overcome or lessened, are not to be found in the Diesel installation.

Man Power Also Wasted

The waste of coal is not the only waste of the small steam plant. While this waste is the largest, there are others of no less importance in their effect on the production cost of the steam station. Man power is wasted. An engineer and fireman for each shift represents the minimum personnel of the average station. The number of men employed increases where plants of more than 200 horsepower are considered. The Diesel engine, on the other hand, is a one man unit, in fact, one competent operator can successfully care for the operation of two or more units, depending on their size and the condition of the load.

Maintenance must be considered in determining the losses of steam plant operation. The steam plant installation includes much apparatus in addition to the primary equipment that requires regular and frequent overhauling. The maintenance record of any steam plant gives a large list of material, the inherent nature of which is such that it wears and disintegrates.

It is not a matter of guesswork to reach very accurate estimates of what the production cost per kilowatt hour or per B. H. P. hour will be for a Diesel plant. Each year finds a great increase in the total B. H. P. installed. Plants are to be found everywhere, and the records available give reference to installations covering an unlimited number of combinations of operating conditions. Operating records over periods of years may be had that show very conclusively the over all economy of the Diesel.—(*Courtesy the Union Tool Company and the Fulton Iron Works Company.*)

Fuel Oil Export Totals

Exports of California fuel oil through the port of Los Angeles from January 1 to September 1, 1924, totaled 18,337,864 barrels, according to the Los Angeles Chamber of Commerce.

Features Oil-Fired Furnace

The General Furnace Company of Philadelphia, Pa., is featuring its oil-fired furnaces and recently issued a folder in this connection, containing views of recent General installations.

Proper Installation Is Biggest Oil Burner Problem

By A. R. Smith*

A MOST serious problem confronting the domestic oil burner industry today is that of proper installation. If the industry is to continue to make rapid strides forward and at the same time lay a solid foundation, more and more attention must be given on the part of the different manufacturers to their installation problem.

The average company engaged in the manufacture or sale of oil burners today has grown from a modest beginning. In all probability the first success was made in the town or city where they were located, and the chances are that their first product was sold and installed direct from the factory. Naturally it was installed right.

As their success spread, dealers in nearby cities and towns, attracted by the future of the oil burner industry, came to the factory, and after a thorough investigation and understanding of the sales and installation problem, became agents for the product and, due to this thorough understanding, made proper installations.

Encouraged by this local and semi-local success, all warranted, of course, the manufacturer begins to broaden his scope of operations. This is the period where the trouble begins.

At the present time it is comparatively simple for any manufacturer to secure distributors or agents, a little advertising and presto!—new agents are immediately appointed, not only within reasonable distance of the factory, but hundreds of miles away, where they are appointed in many cases by mail. This agent has never seen the factory and in the majority of cases has never even seen the product installed he is going to sell and service. He is given installation instructions together with the advice that if unable to install it himself to get some local plumber to make in-

SELLING oil burners by mail, the practice which Mr. Smith so thoroughly condemns, will not only bring disaster to the company undertaking it, but is one that harms the whole industry. ***Fuel Oil*** *is constitutionally opposed to the principle of selling oil burners by mail, no matter if the selling be confined to heating engineers, and the burner is to be installed in the engineer's own home. Every right-thinking burner manufacturer will heartily indorse Mr. Smith's disapproval of such a sales policy —or better, lack of policy.*

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*President, Burnoil Oil Burner Corporation.

stallations for him.

The average plumber has very decided ideas as to his mechanical knowledge and ability, all no doubt warranted in his own line, but which does not apply in the installation of oil burners.

Corporation Sets Example

Some of us watched a corporation last year, one of the largest in the world with millions of dollars in resources, place an oil burner on the market. But did they, or have they, by the weight of their dollars, attempted to sell burners in every town or hamlet in the country? They did not and have not. They have gone ahead quietly and slowly. They placed no agencies at all, although they had applications for hundreds. Three points of distribution were opened, and three only. No one will question that any burner that was sold from these three places was installed right and gave satisfaction—no one will question that in time this corporation will become one of the leaders of the industry, for they know that Rome was not built in a day, and that tomorrow will surely come, just as the greatness of the oil burner will surely come.

No one will question their money making ability or the wisdom that goes with it. This is no time for any one manufacturer to attempt to be the largest producer of oil burners in the world. We have seen one concern proudly advertise that fact, and know the end. Let's proceed slowly, but firmly, and build solidly, for the future, the future that holds such promise for all of us.

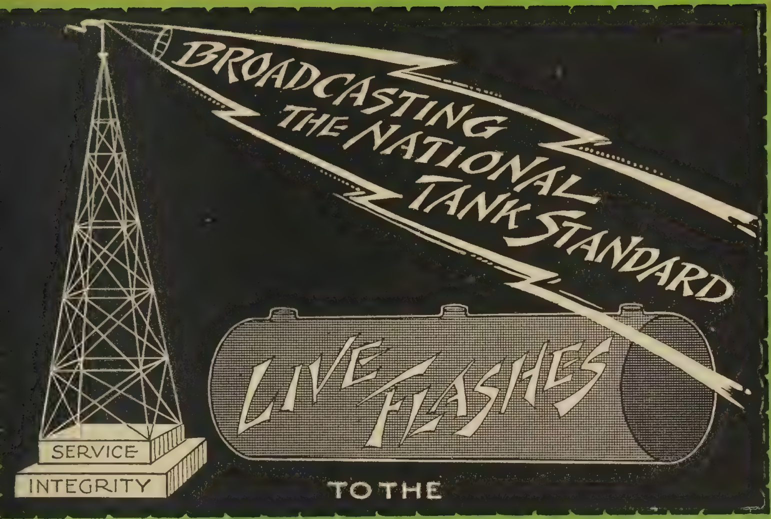
This we can only do by seeing that every burner we sell stays sold, and this can only be accomplished by seeing that every burner sold is *properly installed.*

The burner arrives, is improperly installed, does not function right; the dealer, with other sales depending upon the successful operation of his first installation, is at his wit's end, and is unable to account for the trouble. The original purchaser upon whom so much depends finally loses patience, orders the burner removed, and is thoroughly convinced that while the oil burner idea is great, they are not perfected yet and very gladly passes on this information to all his friends and neighbors. The distributor, having lost heart, may make a half-hearted attempt to continue, but the chances are he charges it up to experience and is through for all time with oil burners.

Stays Industry's Progress

This is happening literally every day and makes it just so much harder for the industry generally to continue to go forward. But this is not the worst; hundreds, yes, thousands of burners are being sold by manufacturers direct by mail to the home owner. In the majority of these cases, all that the manufacturer furnishes is the burner itself, together with the automatic or manual control valve. The buyer is instructed to buy a tank. In most cases he buys a one-time oil drum, mounts this drum on some wooden horse and connects up the burner, under the impression that it will work all right. No intelligent oil burner manufacturer has to stretch his imagination very much to fore-

(*Continued on page* 78)


BROADCASTING THE NATIONAL TANK STANDARD
LIVE FLASHES
SERVICE
INTEGRITY
TO THE

OIL BURNER INDUSTRY

Let's Go;
Full Steam Ahead!

SECOND
ANNUAL MEETING

CHICAGO, APRIL 1-2-3

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Nos. 18 and 19

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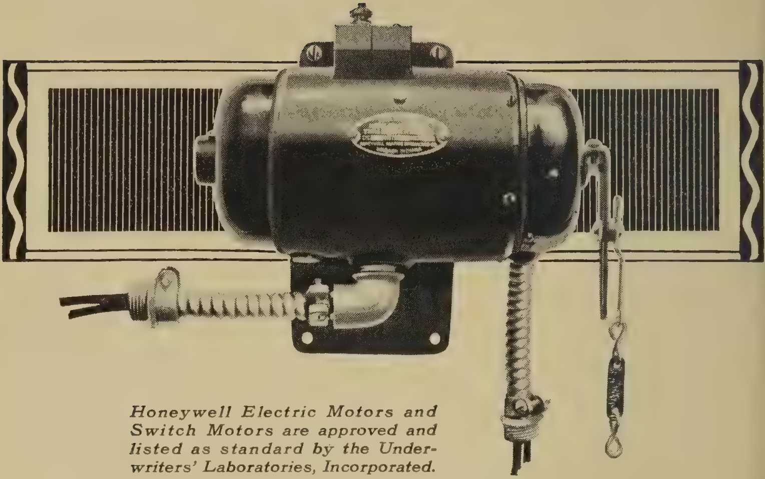


Honeywell Electric Motors and Switch Motors are approved and listed as standard by the Underwriters' Laboratories, Incorporated.

The Honeywell Heating Specialties Co. will exhibit its complete line of quality oil burner controls at The Convention of the American Association of Oil Burner Manufacturers, Edgewater Beach Hotel, Chicago, April 1-2-3, in spaces 24-26-28-30.

The Honeywell Heating Specialties Co.
Wabash, Indiana

HONEYWELL
Temperature Regulators

Finding Oil Burner Sales in the Coal Pile

By E. L. Fowler

AN enterprising merchandiser of oil burners is Edward J. Wohlforth, Caloroil distributor for Bergen County, New Jersey, enterprising because he has found a way to change a coal bin full of coal into four oil burner installations. And a coal bin loaded with a winter's supply in October has heretofore been the burner salesman's Waterloo.

So the story of Mr. Wohlforth's tactics and his triumph is of more than local significance—even to the coal dealers. This was the plan:

Buys Coal

A householder, who admitted late in November that he wanted Wohlforth's burner, pointed to ten tons of anthracite coal, stowed tight in his coal bin. That coal represented $150 in first cost. No one has yet been able to definitely say whether the cost of burning coal—including dirt and dust, with its wear and tear on rugs and draperies, and the cost of ash disposal—is one or two hundred per cent more than the initial cost of the fuel. But this householder, being thrifty, decided it would not be wise to give the coal away and he had concluded to wait until next winter to install the burner, when Wohlforth made this suggestion: "We can demonstrate to you that you will save from 20 to 40 per cent on your present fuel bill with oil and oil burner. Now I'll give you $125 for your coal, and haul it away—and you'll save from $10 to $30 on this season's fuel bill.

"I'll profit because I'll sell two or three burners in the neighborhood as a result of yours."

The prospect being human, capitulated and Wohlforth gave him a check for the $125. Then Wohlforth showed a selling sense that bears traces of genius. He advertised in the local paper that he had 15 tons of high grade coal for sale at $12 a ton, or $3 under the local market. The advertisement specified that no telephone inquiries about the coal would be answered. Anyone interested in such a basement bargain was to inquire in person at number so-and-so street, Leonia, N. J.

In they came and asked, "What about your $12 coal?"

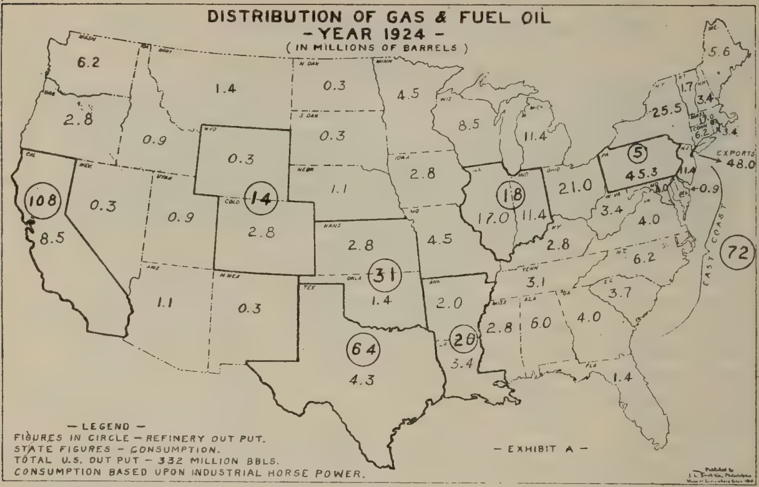
"What are you going to do with it?" asked Mr. Wohlforth.

Of course the answer was "Heat my home."

"But why heat a home with coal?" was the reply. And a burner demonstration followed.

Three of the first ten people who came hunting a bargain in coal Wohlforth sold oil burners.

Moral: It's a poor burner dealer who can't find some good uses for coal.



Who Uses Fuel Oil—How Much—Where?

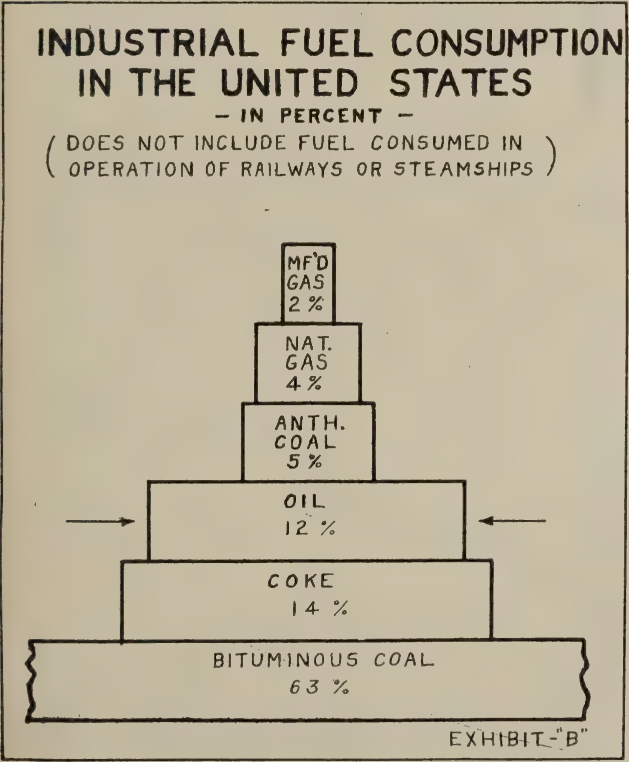
By H. J. Struth

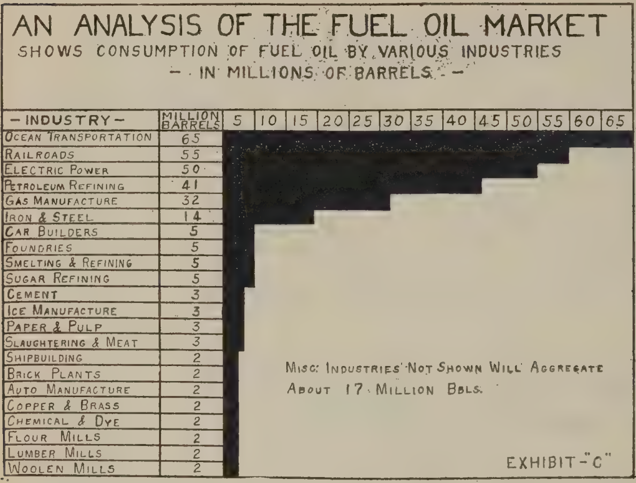
EVERY tick of the clock registers ten and one-half barrels of fuel oil consumed in the United States; so even as you read this short paragraph, about one hundred and thirty-seven barrels of fuel oil are being converted into heat units throughout the country.

That oil fuel is destined to become increasingly popular is borne out by the fact that steamship companies, railroads and industrial organizations throughout the world are rapidly converting their power equipment for the utilization of fuel oil. No little significance can also be attached to the fact that large office buildings in our leading cities are changing from coal to oil and in many homes, the installation of oil-burning heating plants, has made the head of many a family an enthusiastic booster for oil fuel.

Many prospective fuel oil consumers attach to oil an air of uncertainty and use as an argument against it doubt regarding future supply, possibility of price reaching levels which would discourage its use as an economical substitute for coal and fire hazard connected with its storage. These doubts can be quickly dispelled by reviewing the past history of fuel oil, embracing growth in demand, output against this enormous growth and stability of price in ratio to the posted price of crude oil and competitive fuels. In regard to fire hazard, present storage methods, combined with rigid flash and fire-test specifications, places fuel oil in the class of low fire hazard fuels.

The prospective consumer of fuel oil, in order to judge the possible advantages of its use over coal, must of course consider first of all the comparative cost. Unless he thoroughly analyzes the situation, he may be misled into thinking that the qquantity of oil fuel eqquivalent to his present coal consumption would involve a cost in excess of his present fuel bill. To make any fair comparison, he must first of all ascertain the actual cost of his present fuel supply delivered to the plant. To this cost he must add cost of firing and handling, operation and maintenance of stoker equipment, handling of ashes and cost of ash handling equipment, and actual or approximate cost of fuel wasted in cleaning and banking fires. The latter generally averages about 10 per cent of the total fuel cost. A fair study along the lines suggested

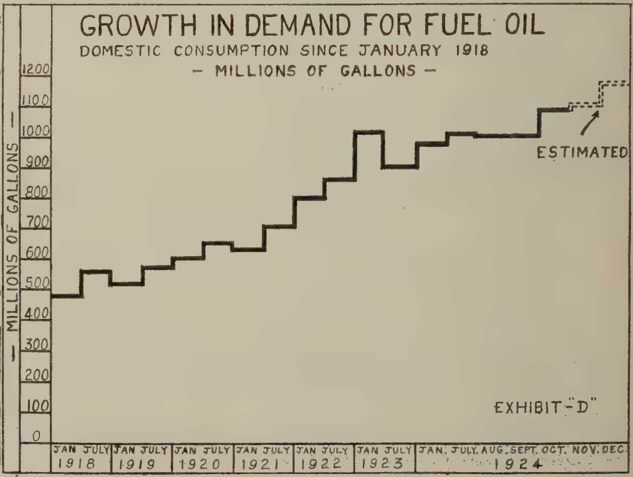




above will reveal decided advantages over coal, particularly in large manufacturing establishments where the fuel bill is one of the largest items.

From a standpoint of B.t.u. value per pound, high efficiency in firing, absolute control of temperature, economy and cleanliness, fuel oil is truly the ideal fuel and closely conforms with the advantages obtained by the consumer of natural gas.

Some idea of the country-wide distribution of fuel oil can be gained by a study of the map presented here, Exhibit "A," which shows the approximate requirements of each state in millions of barrels during the year just ended. Figures shown in circles represent the output of each



refining center in millions of barrels, the grand total for the entire country aggregating 332,000,000 barrels. The requirements of each state are shown in millions of barrels and decimals thereof and have been based upon the industrial horsepower of the individual states.

A glance at the map shows the general movement to be toward the Atlantic seaboard and in this connection it may be well to mention that a considerable portion of California's fuel oil output moves Eastward via the Panama Canal.

Pennsylvania Largest Consumer

The map shows the state of Pennsylvania as the largest consumer of fuel oil, which will approximate 45,000,000 barrels for the year 1924, while it will not produce enough to supply its own requirements. According to the classification of output by the United States Geological Survey, the output of the state of Pennsylvania and is divided between Pennsylvania and Atlantic Coast. In this case, the state of Pennsylvania will produce more than 5,000,000 barrels of fuel oil for the year 1924, but part of its production is included under Atlantic Coast, which includes those refineries in and about Philadelphia and Marcus Hook, Pa.

The movement of the surplus fuel oil supply to points of consumption is shown in the following table, arranged in an orderly fashion across the continent. It must, of course be borne in mind that our fuel oil movement to points of consumption does not really follow such an orderly course, but if it did, here's how it would look:

Movement of Fuel Oil to Points of Consumption

State	Production	Consumption	Surplus
	(Millions of barrels)		
California	108	8.5	99.5
Oregon	...	2.8	96.7
Washington	...	6.2	90.5
Idaho	...	0.9	89.6
Nevada	...	0.3	89.3
Utah	...	0.9	88.4
Arizona	...	1.1	87.3
New Mexico	...	0.3	87.0
Colorado	14	2.8	84.2
Wyoming		0.3	97.9
Montana	...	1.4	96.5
North Dakota	...	0.3	96.2
South Dakota	...	0.3	95.9
Nebraska	...	1.1	94.8
Kansas	31	2.8	92.0
Oklahoma		1.4	121.6
Texas	64	4.3	181.3
Louisiana	20	3.4	177.9
Arkansas		2.0	195.9
Missouri	...	4.5	191.4
Iowa	...	2.8	188.6
Minnesota	...	4.5	184.1
Wisconsin	...	8.5	175.6
Illinois	18	17.0	158.6
Indiana		11.4	165.2
Ohio	...	21.0	144.2
Michigan	...	11.4	132.8
Kentucky	...	2.8	130.0
Tennessee	...	3.1	126.9
Mississippi	...	2.8	124.1
Alabama	...	6.0	118.1
Florida	...	1.4	116.7
Georgia		4.0	112.7
South Carolina		3.7	109.0
North Carolina		6.2	102.8
Virginia .....East		4.0	98.8
West Virginia		3.4	95.4
Maryland and D. C.		4.0	91.4
Delaware	72	0.9	162.5
Pennsylvania	5	45.3	122.2
New Jersey		11.4	110.8
New York		25.5	85.3
Connecticut ..Coast		6.2	79.1
Rhode Island		3.4	75.7
Massachusetts		17.0	58.7
Vermont	...	1.7	57.0
New Hampshire	...	3.4	53.6
Maine	...	5.6	48.0
Exports	...	48.0	....
Total	332	332.0	....

The quantity of all fuels consumed by manufacturing enterprises alone in 1924, in the United

(*Continued on page* 62)

To Investigate Oil Specifications

Specification by oil burner manufacturers of the right oil for their burners as one of the subjects most important to the oil industry, was ordered investigated by the Flammable Liquids Committee of the National Fire Protection Association at its meeting in Wilmington, Del., recently.

This meeting was the committee's first under its new chairman, H. L. Miner, who is in charge of fire prevention and safety engineering for the DuPont interests. Most members of the committee were present, the oil industry being represented by Dr. R. P. Anderson of the American Petroleum Institute, H. L. Shoemaker, engineering department, Standard Oil Co. of New Jersey, F. A. Epps, fire and safety prevention engineer, Tidewater Oil Company; F. W. Staley, the Texas Company, and W. C. Platt. The burner manufacturers were represented by E. P. Bailey, president of the American Association of Oil Burner Manufacturers.

The investigation was prompted by a discussion of flues, and dampers in flues where oil is burned. One of the points brought out was that flues were dirtied with soot so frequently because the householder used the wrong oil. A sub-committee was appointed to draft specifications for the right kind of oil for household use and to look into the possibilities of making certain that the oil burner manufacturer specifies the right kind of oil and the oil company delivers the right kind of oil. It is expected that part of the problem will be correlating some of the ideas of the oil burner manufacturers with the character of product that is most easily procurable from the oil companies over the country.

Members of the committee are Mr. Smith, Dr. Anderson, Mr. Bailey, Mr. Newell and Mr. Shoemaker.

Graver Issues Booklet on Water Softener

"Horizontal and Vertical Pressure Type Water Filters" is the subject of Bulletin 501, just issued by Graver Corporation, East Chicago, Ind. The bulletin describes filtration methods and shows the construction of the Graver filters which are furnished with a perforated strainer plate instead of a pipe manifold and strainer heads for the collection of filtered water. Complete tables of sizes and capacities are given.

To Meet in Chicago

The Illinois chapter of the American Society of Heating and Ventilating Engineers will meet in Chicago, on March 9, at the Engineers' Club. A special effort will be made to get all oil-burner manufacturers and dealers in Illinois to attend, as the program will contain much of interest to them.

Opens Philadelphia Office

B. Frank Weiss has opened an office at 4308 North Broad Street, Philadelphia, Pa., and will act as distributor for the Sword & Kimber Oil Burner Company.

Oil Industry Sees No Crude Shortage

By Arthur G. Winkler

THE oil industry has exhibited an instant readiness to cooperate with President Coolidge's recently appointed Federal Oil Conservation Board. The movement, both by the President and the industry, is one to eliminate waste in the finding, producing, transportation, refining and marketing of oils—a conservation movement, not a concert of alarmists over our oil supply. In no sense can it be taken as an admission by the oil industry that an oil shortage is imminent.

Gives Immediate Assistance

When, late in December, the President created the Conservation Board, on which he placed four of his Cabinet members, the oil industry, through the American Petroleum Institute, immediately took action to assist the new body as much as possible. This action was the appointment, by the institute's president, of a committee of eleven prominent oil men to collect the facts and study the problems of the Federal Board, a task which, because of their knowledge and position, they could easily and quickly perform. More easily, in fact, than the Conservation Board members themselves.

This has been done in deference to the President and the board, and was a response that would have been given by the leaders of any large and important industry under similar circumstances, whether the leaders sympathized with, or thought the President's action justified or not.

It is said that the first move directly followed an audience given in December by President Coolidge to Henry L. Doherty, president of Henry L. Doherty & Co., who has long been the sole prominent member of the oil industry to contend that the industry's production methods were wasteful. Incidentally, he is also the most outspoken champion of oil burning. It is also said that Mr. Doherty was assisted in his efforts by George Otis Smith, acting director of the United States Geological Survey. Whether or not Mr. Doherty hopes to have his own plan for government controlled, systematic oil production and conservation adopted is not known, but it was rejected by the directors of the American Petroleum Institute when they met in Atlantic City recently, this after Mr. Doherty had been given three hours to explain the plan to them.

Sends Out Inquiries

To date the new board has sent out several inquiries to the technical press and to members of the various branches of the oil industry, asking for suggestions and for answers to several lists of questions calculated to give the board a basis on which to begin their investigations. All these have been answered in good faith and the industry is giving every evidence of its desire to assist in establishing more efficient production and handling methods if possible.

But this action does not indicate a fear of oil famine. That there is some waste attending present methods is acknowledged. New steps toward efficiency in all departments of the oil industry are constantly being made. That the industry has been slightly unsettled economically during the last few years, due to overproduction, is also acknowledged, but scantiness of reserves does not even begin to loom as one of the industry's major problems.

Stocks Increase in 1924

Total production of crude oil in 1924 was 2 per cent less than the total for the previous year, reaching 707,265,000 barrels of 42 United States gallons. Yet stocks of crude oil on December 31, 1924, were 28,000,000 barrels greater than on December 31, 1923, and stocks of fuel and gas oils were increased during the same period by approximately 155,000,000 barrels.

E. L. Doheny, head of the Pan-American Petroleum Corporation and subsidiary companies who are the principal factors in the fuel oil market on the Atlantic and Gulf Coasts, one of the most far-seeing men in the oil industry, in a statement recently made public, declared: "We will have oil and gasoline long after these men, who are saying the supply will give out, are dead and gone. Texas affords the best opportunities for the greatest oil field in the world. There is more excitement in that state than in any other section, and it will not be long before they uncover even greater oil resources than they have so far."

Standard Oilgas Issues Folder

Standard Oilgas heaters in several different sizes and designs are illustrated in a folder recently issued by the Standard Oilgas Heating Company, Inc., Lansing, Mich. This burner is of the air preheating type, using a kerosene fuel, which is conducted to the combustion chamber under pressure produced in the small storage tank to which a diminutive hand air pump is attached. Because it contains but two units—the burner proper and the tank, which are connected by the small flexible feed wire—this burner is portable and may be moved about wherever required.

Hardinge Employees Banquet

The Hardinge Fuel Oil Heating Company, Chicago, Cook County sales representative for Hardinge Bros., Inc., Chicago, combined its usual monthly sales meeting with a dinner at the Great Northern Hotel, February 5. The salesmen and officials of the company were guests of W. J. Price, vice-president and sales manager.

J. W. Owens Is Promoted

J. W. Owens has been made vice-president in charge of sales of the Federal Gauge Company, superseding himself as sales manager.

Heating the Home

Electrical and Gas Connections Important Part of Installation

BY GEORGE W. GRAVES

CARE should be exercised by the installation man, when installing the thermostat, against tracking dirt around the house and soiling the walls and also in marring and damaging the furniture, trim or baseboards. In installing the thermostat, any plaster that falls when drilling the walls should be carefully cleaned up.

When the thermostat has been connected after the wiring has been run, the hole in the wall through which the wire extends should be carefully and thoroughly packed with cotton in order to prevent any cold air coming through the hole and affecting the thermostat. Enough wire should be left back of the thermostat and then pushed into the wall to permit the thermostat to be readily worked with.

THE good installation man must be a bit of an electrician, pipefitter, carpenter and machinist as well as a good oil burner fireman, well versed in the principles of oil combustion and burner operation. Mr. Graves gives here some excellent advice on wiring and running the gas line. That it is worthwhile and valuable is made certain by the fact that it is based on his long and thorough experience in installation work with one of the oldest oil-burner companies.

Great care should be exercised not to drive staples through the thermostat wire at any point and care should be taken where wiring is run into a sliding door casing, in order that the same is secure and free from possible later damage. The wiring should be run the shortest practical distance to the terminal block, if one is used, or any other point of connection between burner and boiler control. If the terminal block is used, it should be so located on the basement ceiling that it will be accessible for future service requirements. Under no circumstances should the thermostat wire be run along or adjacent to the basement floor, as difficulty undoubtedly will be encountered in the way of shorts when the basement is washed or in case of floods.

When making wiring connections, the wires should be carefully skinned and scraped and care should be taken to see that only bare wire is under the connectors and the latter securely made. It is well to knot the insulation on each individual wire, when outside insulation cover is removed, to prevent further unraveling. In running the wire from the terminal block or point of contact to the boiler control, same should run the shortest practical distance along risers. Slack should be provided at the instrument and pig tail. In cases where the thermostat has previously been installed in residences and the same thermostat location is desired, new wiring must always be used and under no circumstances should the use of old wiring be permitted.

Gas Line Precautions

The same precautions that have been suggested for the oil line should be used in running the gas line. Before shutting off the gas at the meter, however, the occupants of the premises should be advised that this is to be done. Arrangements should be made so that the gas will not be shut off when meals are being prepared. If there is an automatic gas hot-water heater installed, main value on this unit should be shut off. In tapping the gas main for the gas line a tee should be inserted and the burner gas line taken from the top and not the bottom. A loop or pocket should be formed to properly take care of the condensation. The gas line should be run along the ceiling to a point just over the regulator and then dropped to the burner, being connected to the burner with a swing joint. If there is a comparatively short run from the main line to the burner, it is permissible to use quarter-inch pipe for the gas line. If, however, there is a long run, equipped with many turns, three-eighths inch line should be used. In either event a three-eighths inch cock should be inserted in the gas line just ahead of the burner. This is necessary on account of the fact that the majority of quarter-inch gas cocks are equipped with a round drilled hole which does not permit a full and sufficient flow of gas into the burner gas valve.

Check for Leakage

When the gas line has been run the gas should be turned on at the meter as soon as possible and the occupants so advised. The pilot light of the burner as well as the pilot on the automatic gas hot-water heater should be opened. The entire gas line should be carefully checked for leakage.

In running the main electrical wiring a square "D" box should be installed on a winged panel, preferably within three feet of the service box. It is good practice to scrape the enamel from the surface of the service box, square "D" box and burner connection box before inserting the end connector. Conduit should be used only where ordinances require. All electrical work must conform to code and regulations existing in the particular locality. Every installation man should be familiar with all details

(*Continued on page* 58)

The Place of Furnace Oil in the Oil Industry

By O. P. Keeney*

(Continued from the February Issue)

HAVING established, I hope, the fact that the use of furnace oil is a factor and likely to become an increasingly important factor in the petroleum industry, the question very naturally arises—"What is furnace oil?"

THIS is the second part of Mr. Keeney's summary of the oil and oil burner situation, written from the standpoint of the best minds in the oil industry. Thinkers among oil men have long realized that keeping in step with the oil burner manufacturers will eventually develop a market for the oil industry that will be as valuable as any it now supplies. Mr. Keeney has given some practical information on oils that both manufacturer and owner of oil burners may study thoroughly.

At the present time it is impossible to definitely ascertain how many different grades of this classification of oil are being furnished throughout the country. One oil company, after a survey of conditions in its own territories, reports that fifteen grades were being supplied for burners of various types. I believe, however, that all the various grades could be roughly classified into three divisions:—

Class 1—Unfinished kerosene;

Class 2—A very light and high grade gas oil;

Class 3—Light fuel oil over 24 gravity.

The oil industry has stood by and watched the growth of oil burning in homes and has been called upon to furnish fuels suitable for any type of burner which any manufacturer saw fit to sell. In general, the natural draft types of burners have required the Class One furnace oil or practically unfinished kerosene, while the forced draft and rotary types can use either the Class 2 gas oil or in some cases Class 3 light fuel oil, depending upon the degree of atomization accomplished by the particular burner. The burners approved by the Board of Fire Underwriters are divided between the three general types, as follows: Natural draft, 3; forced draft, 7; rotary, 2; but by far the larger proportion of burners in actual use are of the natural draft type—this for the reason that the natural draft burner of the vaporizing type is cheapest to manufacture and is generally sold at a lower price than those of other types.

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*Tidewater Oil Company.

A careful investigation discloses that last year the probable percentages of the various classes of furnace oil consumed throughout the country were:

Class One	75%
Class Two	15%
Class Three	10%

This year the situation has changed to this condition where the consumption of various furnace oils throughout the entire country is probably:

Class One	50%
Class Two	30%
Class Three	20%

It is very apparent that furnace oil is far from being a standardized, uniform product. The unmistakable trend is toward the use of heavier products. Undoubtedly the descending scale of prices for heavier fuels is largely responsible for this trend. In the consideration of what are the really essential properties of furnace oil, let us examine ten of the characteristics.

Gravity Indicates Qualities

The gravity of the product is in itself of no paramount importance except as it is indicative of other properties of desirable or undesirable qualities. Of course as long as furnace oil is sold by the gallon, the lower the A. P. I. gravity without accompanying undesirable qualities, the greater will be the B. T. U. content per gallon, generally speaking, by reason of the increased number of pounds per gallon. Theoretically, therefore, the lower the gravity, other conditions being suitable, the greater the efficiency. Also, under present general conditions, the lower the gravity, the lower is the price of the oil.

The Flash and Fire Tests must conform to the minimums established by local fire regulation, a safe minimum closed flash being 100° F.

All Specifications Important

It is dangerous to place too much reliance on any one or two particular tests in preparing specifications, as is evidenced by the actual experience of one distributor who placed too much confidence in the setting of a maximum Flash Test as being indicative of the desirable qualities of a furnace oil for use in a particular burner. The refiner met his specifications for Flash Test, but in so doing must have used a product of a very high initial boiling point to which he added a small proportion of a relatively light fraction. This particular oil met the flash specification, but the pilot of the oil burner only made the oil flash without any continued fire resulting. When the situation was explained to the refiner, he furnished a satisfactory product, but was governed not only by the flash but also by the Fire Test and the distillate range of the product he supplied. The boiling point range at the present time is of more importance than it should be for the good of either the Oil Industry or the burner manufacturer. Particularly is this true of furnace oil for use in most of the burners of the vaporizing type and it also is to be considered in connection with the effectiveness of the pilot in any automatic system. The exact limits of a satisfactory

(*Continued on page* 48)

Fuel Oil Markets

Demand Weak Following Rise in Crude Oil Prices

HIGHER crude prices during February influenced a slight weakness in fuel oil, Group Three territory. Furnace oils reacted to the change. Fuel oil prices keeping pace with the crude advances caused the trend back to coal to start in some industrial plants of the middle-western territory.

The alleged threat of many large users to return to coal should fuel oil prices go higher partly materialized. This accounts for the weakened condition of the market. With crude prices due for other advances fuel oils will be affected, but a temporary recession following each advance may keep the weakness from assuming large proportions. Many refiners feel that this condition of the market is only temporary.

Contracts Keep Market Steady

A larger amount of fuel oil contracts by leading railroads and industrials this season is counted on to hold the market fairly steady, regardless of what open market buying may bring forth. The recession in prices was expected and is probably of little significance. It is still a seller's market and will very likely remain so during the remainder of the season.

The big demand for high gravity oils with big gasoline content leaves more lower grade crude for fuel oil cracking. This will influence the fuel market at a time when it is needed, as numerous cracking stills will be utilized to prepare for the coming gasoline seasonal demand.

Regular grades of 24-26 Oklahoma-Kansas fuel oil are quoted at $1.30 to $1.32½ cents, as compared with peak of $1.35 in this territory. This general average is followed throughout Group Three section by all grades of fuels and distillates. It is generally thought that the peak in prices has been passed.

Texas Prices Higher

In North Texas prices are about 5 cents higher on each grade because of more local marketing territory and favorable freight rates. Smackover, Ark., fuel is bringing $1.25, with demand little affected. Gulf Coast grades are about 5 cents under prevailing quotations a month ago.

Distillates or furnace oil are in good demand, but it appears that influences working for higher prices have overdone the business. Several months ago refiners started to prepare for the domestic heating season, and jobbers bought up early only to find the buying overdone and storage taxed. The 38-40 straw distillate was quoted by Oklahoma refiners at 3¾ cents, as compared with 4 cents thirty days previous.

Evidence of a strong fuel oil market in spite of a slight weakness is exhibited in case of Smackover and other low grade oil areas which are on a parity with the Mid-Continent and slightly under the regular Mid-Continent price. Another instance is in the fact that railroad contracts around the first of the year were made on a basis of 70 per cent of the posted crude price, whereas they were formerly based on only 60 per cent of the posted price.

Mid-Continent refiners refuse to take the "return to coal" situation seriously, believing that the market will readjust itself to conditions without loss of any large amount of business or inconvenience. On the other hand, it is reported that users of fuel oil are generally more favorable to its handling than to coal.

Prices, tank car lots, f.o.b. refineries, Group Three territory, on Feb. 15, were quoted as follows:

Fuel Oil, 24-26.......	$1.30	$1.32½
Fuel Oil, 26-28.......	1.35	1.37½
Gas Oil, 32-36.......	.03½	.03¾
Distillate, 36-38......	.03½	.03¾
Distillate, 38-40......	.03¾	.04
Kerosene, 41-43......	.05	.05¼
Kerosene, 42-44......	.05¼	.05½

Patents New Burner

An oil burner has been developed and patented by M. H. Reimers, Hoboken, New Jersey, in which the body portion has a liquid fuel passage and an outlet orifice with an annular groove connecting with the supply and the outlet at diametrically opposite points.

OHIO MOTORS

Sleeve Bearing or Ball Bearing

It is a fact that an Oil Burner can render no more satisfactory service than the motor which drives it.

The Ohio Motor, built with that idea in mind, is known by its many users as the motor that assures —reliable—trouble-proof motor service.

THE OHIO ELECTRIC AND CONTROLLER CO.
5920 Maurice Avenue • Cleveland, Ohio

Member of American Association of Oil Burner Manufacturers.

Dealers interested in obtaining our franchise and new territory

Look for us in Booths 6 and 7

during the convention
of the

American Association of Oil Burner Manufacturers

Edgewater Beach Hotel, Chicago
April 1, 2, 3

HOME APPLIANCE CORPORATION
2818 Locust Boul. St. Louis, Mo.

Manufacturers of

ELECTROL

Electric Ignition Quiet Operation

AUTOMATIC OIL BURNER

—the perfected oil burner with the added essential feature of automatic electric ignition. Clean, quiet, safe. Listed as standard by Underwriters' Laboratories.

Publish Booklet on Rotary Oil Burner

One of the most complete booklets of its kind that has yet appeared is that issued by the Pennsylvania Globe Rotary Oil Burner Company, Philadelphia, describing the rotary oil burner. The history of the company, of the development of the burner and much detailed information about the burner is given. Drawings and photographs are scattered profusely through the booklet, giving a clear illustration of the burner's operation.

In the Rotary the oil is introduced through a hollow shaft to a horizontal, saucer shaped, rapidly revolving disk under which a fan revolves also, forcing a draft of air up through perforations in the disk to furnish sufficient air for the combustion of the oil. Power is furnished by a small water turbine attached to the shaft of the fan and disk. Control is automatic.

International Conference on Oil Pollution

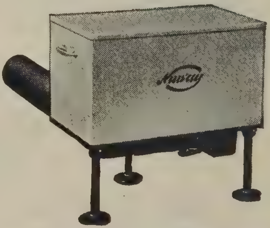
Representatives of between 40 and 50 maritime nations are expected to attend a conference on oil pollution of navigable waters, soon to be held in Washington, D. C. An appropriation of $42,000 was asked of Congress recently by President Coolidge, transmitting an estimate of the cost from the Bureau of the Budget, needed to pay clerical and other costs incidental to the meeting. The meeting is the result of a joint resolution adopted by Congress.

—*NOW!* National Distribution

We now offer the Nu-Way Automatic Oil Burner to the trade for general distribution to the buying public. After having watched the performance of a number of Nu-Way Burners for a period of over two years, operating in the best homes in our own Tri-cities, and also after having sold a number of Nu-Way Burners through local dealers covering a radius of five hundred miles of our factory, we are now ready to go into national distribution.

The Nu-Way thoroughly atomizes the oil and mixes it with the exact proportion of air necessary for perfect combustion, and this it does automatically. This is a new and exclusive method found only in the Nu-Way. The success of our present dealers is largely due to this single feature.

There is thirty-five years of engineering skill and manufacturing experience back of every Nu-Way Burner.



Write for booklet, "Home Heating Supremacy"

We Invite the Strictest Investigation of Only High-Class Dealers

DOOLEY & BRADEN CO.
ROCK ISLAND, ILLINOIS

OIL
AMERICAN ASSOCIATION OF OIL BURNER MANUFACTURERS
BURN OIL THE MODERN FUEL

The Annual Profit-Meet

The Second Annual Convention and Exposition will be held April 1, 2 and 3 at the Edgewater Beach Hotel, Chicago, Ill.

Meet your friends there, or if not a member, come and get acquainted with the association members. If you will be in the oil burner business permanently, it will pay you to join the association.

Reduced fare on all railroads under the certificate plan. Membership blanks may be secured on request.

Those Who Desire to Exhibit Should Wire for a Reservation at Once.

AMERICAN ASSOCIATION OF
OIL BURNER MANUFACTURERS

350 Madison Ave. New York City, N. Y.

Oil Burning Kettles

Oil burning kettles are described in a folder recently issued by the Aeroil Burner Company, Inc., Union Hill, N. J. In it are shown various sizes of tar, pitch and asphalt, kettles, intended for roofing, flooring, paving and similar work.

New Burner Companies

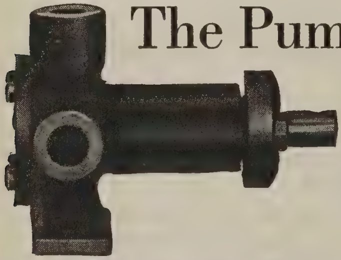
Oil burning and gas making apparatus will be manufactured by the Standard Oilgas Heating Company, recently organized in Lansing, Mich., with a capital of $20,000. The officers of the new organization are: Martin J. Somers, president; Louis F. Bretenwischer, first vice-president; Ned E. McLaughlin, second vice-president; James Collins, secretary, and John L. Bush, treasurer.

Other recent incorporations reported included the Denver Oilomatic Heating Company, capital, $10,000, and the Ray-dio Oil Burner Company, Central Falls, R. I., of which F. H. Keran is president.

Burn Oil in Manufacture of Pottery

Pre-heated oil only is burned in the combustion chambers of the new china decorating kiln of the Mount Clemens Pottery Company, Mount Clemens, Michigan. The oil is heated from 350 to 400 degrees Fahrenheit and fed to the burners at about one pound per square inch by a high-speed, water-cooled fan.

The Pump for Oil Burners



VIKING PUMPS

Identically the same simplicity of design, quality of manufacture, and steady, continuous flow feature this 3/8" fuel oil pump that characterize the larger Vikings of which there are now over 65,000 in use. It's the pump you can install and forget for long, continuous service is assured. Furnished for belt or motor drive if preferred. Guaranteed for working pressures of 50 to 100 lbs. Investigate.

VIKING PUMP CO., Cedar Falls, Ia.

Send for FREE Pump Book

B. F. Schirmer Co., Inc.	342 Madison Ave., New York, N. Y.
Viking Pump Co.	549 W. Washington Blvd., Chicago, Ill.
Viking Pump Sales Co.	204 Grand Ave., Milwaukee, Wis.
Viking Pump Co. of Canada, Ltd.	Walkerville, Ontario
Menge Pump & Mach. Co., Ltd.	862 Tchoupitoulas St., New Orleans, La.
De Laval Pacific Co.	61 Beale St., San Francisco, Cal.
Kerr Machinery Corp.	Kerr Building, Detroit, Mich.
Hayes Pump & Machinery Co.	94 Pearl St., Boston, Mass.
The Schirmer Co.	750 Prospect Avenue, Cleveland, Ohio
Southern Engine & Pump Co.	Houston, Texas
Power Equipment Co.	Oliver Building, Pittsburgh, Pa.
Walter H. Eagan & Co.	Stephen Girard Bldg, Philadelphia, Pa.
Walter O'Bannon Co.	519-21 E. First St., Tulsa, Okla.
Norton Paper Goods Co.	719 Delaware St., Kansas City, Mo.

Save Your Copies

Fuel Oil issues of the past are becoming more valuable each day. They are a history of the industry and are being referred to regularly.

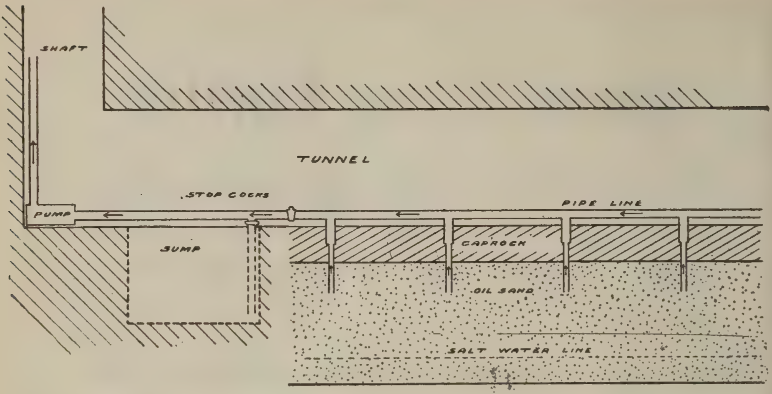
Because a pile of copies soon become damaged, we have provided a safe way to keep them in the

FUEL OIL BINDER

It is substantially finished in cloth and leather, and lettered in gold. Holds from one to twelve copies of the magazine and is made to permit easily the addition of a new copy each month. We offer it at cost—$1.40—check to accompany order.

FUEL OIL *for Heat and Power*

350 Madison Ave., New York City
20 East Jackson Blvd., Chicago



Bare general plan of tunnel and one shaft, with location of pump and sump indicated. In this case the tunnel is run above the oil sand in order to utilize hydrostatic pressure. In case of tunneling below lower cap-rock, pipe line and "mine-wells" into sand would be in ceiling. This is expected to be a normal case.

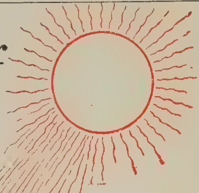
New "Mine-Well" Process Will Increase Oil Production

By John W. Naylor

IN the many and varied estimates of the petroleum resources which have been made and published during the last few years there is one vast and little known oil reserve that has been almost consistently left unnoticed. This reserve consists of the oil still left underground when a field has produced practically to its capacity by present methods of recovery. Scientific research, notably by the United States Bureau of Mines, has indicated that for every barrel of oil recovered from the beginning of the oil industry in this country, probably at least four barrels have been left underground, unrecoverable by oil wells and present methods. Actual measurement at Pechelbronn in Alsace, France, where the sand in a field exhausted by the well method has been mined and made to give up all of its oil, indicate that the quantity left underground may be even higher. There only about 17 per cent was recovered by the wells.

Since American fields have produced approximately 8,000,000,000 barrels of oil to date, these figures indicate that more than 32,000,000,000 barrels of oil have been left underground, unrecoverable by

The Marvel Fuel-Oil Burner



Will Heat Your Home Better —For Less!

The Marvel will burn any oil from 28 gravity up. The lower gravity oils are cheaper—therefore the Marvel is more economical.

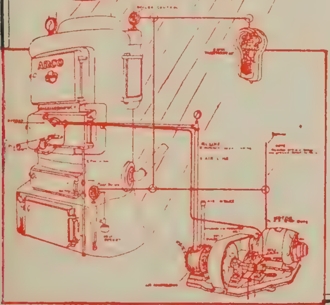
The Marvel Fuel-Oil Burner burns the oil completely. To burn oil successfully the temperature in the furnace must be kept high by incandescent refractory material.

With the Marvel the flame strikes a baffle of fire brick, is deflected downward, then curls back and upward, filling the fire box.

The Marvel is simple with fewer and less complicated parts, all of which are standardized and easily replaced.

No changes of a permanent nature are necessary in your boiler when the Marvel is installed — the grates are not disturbed and the boiler can be restored to its original condition in a few moments.

Marvel's method of atomizing the oil eliminates noise and spreads the flame over the entire heating surface of your boiler which was not built for an intensely hot condensed flame.



ATTENTION DEALERS

If Marvel is not represented in your territory write to us. We still have some very desirable districts open. But act quickly.

MARVEL OIL BURNER CO.
711 W. Washington St.
Chicago, Ill.
Tel. Haymarket 7687

SEND US THIS COUPON

MARVEL
OIL BURNER CO.
711 W. Washington St.,
Chicago

Please send me full information about the Marvel Fuel-Oil Burner without any obligation on my part.

Name ....

City ....

our present methods. This is enough, without taking into consideration future discoveries, and improved refining methods to stave off the oil famine (the bugbear of the motorist who reads the feverish predictions of approaching shortage) for at least fifty years. For, if entirely recoverable, which it will probably be in the long run, it would furnish production at about the 1924 rate for that long a period.

Present Methods Exhaust Gas

The reason for the failure to recover all the oil by present methods has chiefly to do with the exhaustion and waste of the gas which is associated with the oil, and not with the oil. Scientific research has definitely determined this. The gas, a large part of which is dissolved with the oil under pressure, is given up much faster than the oil, when the pressure is released and escapes without performing its full duty of expelling all of the oil. Even with the artificial stimuli which have been devised for well production, the total recovery with present methods is only infinitesimally increased. This applies even to the water flooding which has been practiced in Eastern fields, the most radical resort of all. Experiments recently reported tend to show that even the most advanced of flooding methods increases recovery only slightly beyond the 20 per cent recovery of the oil in the oil sands, which research of the Bureau of Mines has suggested as a general average.

Now, as to the move toward the opening of this great reserve. It

MECHANICAL DEVICES COMPANY

Pumps for Oil Burners

"What the Underwriters require on all gravity burners—the maximum supply tank directly connected to the burner shall not exceed 60 gallons."

Maximum storage permitted within the basement where so called low flash heating oils are used, 275 gallons.

Oil from the storage to the supply tank must be pumped. Gravity flow from one tank to the other is not permitted."

M-D-Co. Rotary Hand Pumps are built to do the transferring of fuel oils and will do the work with ease and dependability.

Write today for catalog and prices.

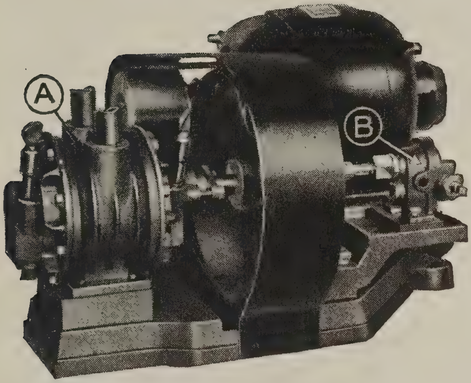
MECHANICAL DEVICES COMPANY

Main Office and Factory: Aurora, Illinois

CHICAGO OFFICE
549 W. Washington Blvd.
Phone: Franklin 2471

Eastern Office
325 Federal Street
GREENFIELD, MASS.

A Dependable Pump Unit for Oil Burners



(A) **Lammert Rotary Air Pump**—for steady flow of air —3½ to 700 cu. ft. per minute, under any pressure up to 25 pounds.

(B) **Oil Pump**—directly coupled to air pump shaft, delivers even, steady flow of oil efficiently.

Lammert Rotary Pump Unit

The Lammert Rotary Air Pump is the time-proved result of over 20 years' pump building experience, and is not a new untried device. Simple sturdy construction—without valves or other troublesome parts—and automatic lubricating feature give dependable continuous operation for long periods of time with a minimum of attention. It is quiet in operation, without vibration.

Equipped with silent belt drive and automatic takeup, these oil and air pump units provide the utmost in satisfactory economical service. Built in a range of types and sizes, they are easily installed and readily adjustable to the particular requirements of almost all oil burner equipment.

Write for Descriptive Circular

LAMMERT & MANN CO.

Oil Burner Dept. **215 N. Wood St., Chicago, Ill.**

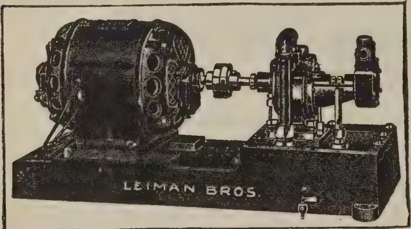
is not one to cause immediate consternation in the industry, it may be said, parenthetically. In the estimation of even the most sanguine, it will take five years before it becomes a factor. But it must be reckoned large in calculations of the future oil supply from this time forward.

To Develop Commercially

It is the impending development on a commercial scale of the Ranney "Mine-Well" process of oil recovery. A half interest in the patents has been purchased, and its development undertaken by the Standard Development Company, patent holding subsidiary of the Standard Oil Company of New Jersey. Independent of this, an installation by another firm of large resources has been licensed, and will be made the coming summer.

The performance of this process in an experimental installation at Jacksboro, Tex., a short distance west of Fort Worth, "the only oil mine in the two Americas" has led many eminent engineers to agree with the originator of the process, that it will recover at least twice as much more oil than has already been taken from fields exhausted by present methods of production—perhaps more. It will do this at a lifting cost of 2 to 25 cents per barrel.

The Ranney Process is not strictly an oil mine. It is a combination of the mine and well system. Oil mining has been tried before in America, oil field traditions, and no doubt authentic records, tell us. The result has been, usually, that the first time a min-



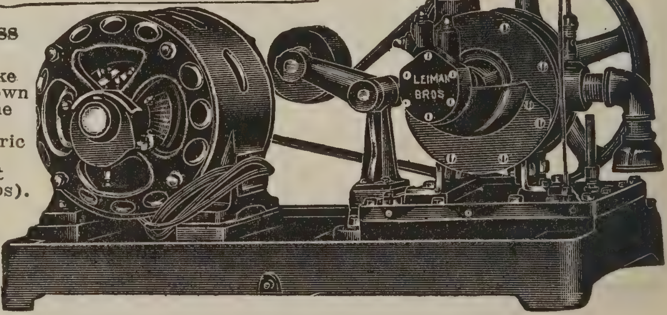
Leiman Bros. Oil and Air Units with self lubricating oil device. Both coupled and belted units in large and small sizes. Oil delivered to burner without fluctuation and atomized by the air supply.

Leiman Bros., 60 Lispenard St., N. Y.
Makers of good machinery for 35 years.

Steady and Reliable

Noiseless

The air pumps take up their own wear. The oil pumps are eccentric positive drive (not gear pumps). We also have oil control valves pilot control and straiers.



Easy to Sell to Oil Burner Users ~~~

Provides Many of the Same Advantages

Convenience — cleanliness—healthfulness—safety! Oil Burner users consider these qualities essential to their welfare. That is why they installed an oil burner. That is why they can easily be sold the Home Gas Incinerator.

It deals a death blow to the filthy garbage can and the messy rubbish barrel. Both vacate the premises when the Home Incinerator is installed. A sanitary back yard. A clean basement. These advantages have great weight with oil burner users.

The Home Gas Incinerator is elbow high. Feeds through a foot-wide top opening. Push a button and light it. Pull a lever and the ashes fall into a deep, galvanized bucket. Ingeniously constructed so garbage is dried out, then burned completely—2¾ bushels reduced to a pint of ashes. No smoke or odor. Economical to operate. Simple, NEEDS NO SERVICING. A real money-maker. Write today for full information.

Home Incinerator Co., 209 Grand Ave., Milwaukee, Wis.

The Home IncineratoR

ing tool struck a piece of rock a gas explosion promptly ensued and mine and miners went to glory without further delay.

In the Ranney process the mining is not done directly in the oil sand; it is done just above or below the caprock or other impervious formation which seals off the oil sand. The tunnels are thus sealed from the oil and gas by the caprock, and the shaft is carefully sealed from the oil or gas. At intervals of five or ten feet in each tunnel a hole, the size of an oil well, is bored through the caprock into the sand. A steel nipple extending through the caprock to the sand is sealed in the caprock. This is connected with a pipeline running through the tunnel by an iron cross. Accordingly, the oil and gas in the oil sand is still sealed off from the shaft and tunnel. This pipe line runs to a large sump or tank, located at or near the bottom of the shaft. From this point it is raised to the surface and pumped into ordinary storage tanks by one central pump.

Editor's Note. — Mr. Ranney states that in northern Oklahoma the lifting cost is about $1 a barrel and in Pennsylvania it is about $3, but that they hope to reduce this to from 2 cents to 5 cents a barrel.

Sladkey with Williams

E. W. Sladkey, formerly sales manager for the Winslow Boiler and Engineering Company, Chicago, Ill., has joined the sales force of the Williams Oil-O-Matic Company, Bloomington, Ill.

New-Type Oil Burner Proved for Six Years

Six years ago the first Oil-O-MATIC Oil Burner was made. Nearly 20,000 are now in use and every user is satisfied. Burns cheapest fuel oil. No continuous pilot light. No part inside furnace or boiler. No gears. Moving parts run in oil. Tested and listed as standard by Underwriters' Laboratories. One of the fastest selling oil burners on the market. New deferred payment plan doubling sales for present dealers.

A few territories still open to men who can qualify. Write today for full information.

Williams Oil-o-matic Heating Corporation

Main Office and Plant
BLOOMINGTON, ILL.
Branches in all leading cities.

WILLIAMS
OIL-O-MATIC
HEATING

ATTENTION Oil Burner DEALERS

Before March 10th I want to send every Oil Burner Dealer a Most Important Message

A Message worth while and of great benefit—(I have nothing to sell) therefore—you—everybody—right now please send me the following information:

1. *Are you going to the Chicago Oil Burner Convention on April 1, 2 and 3? (Don't say No.)*
2. *If you have a local Oil Burner Association, give me the name of the Secretary.*
3. *Please give me your estimate of the number of burners of all kinds which will be sold in your locality during 1925.*

Address: J. E. GRADY, President,
Michigan Oil Burner Dealers' Association
5103 Cass Avenue, Detroit, Mich.

Sulfur in Fuel Oil Not Always Objectionable

Sulfur in heavy fuel oil is not objectionable for most purposes. In the government specifications only in the navy standard fuel oil, where a high grade fuel is desired, is the sulfur content limited and even there 1 1-2 per cent is allowed. For metallurgical processes where the flame or products of combustion come in direct contact with the metal, high sulfur content may be objectionable, according to W. R. Quinn in *Combustion.*

When burned in boilers the sulfur is not objectionable insofar as the boiler is concerned, since the gases are hot enough to prevent any corrosive action, but if unlined steel stacks are used, the water forming from the burning of the oil will condense and absorb the sulfur dioxide gas and corrode the stack. Steel stacks should therefore be lined for a considerable distance from the base to prevent failure of the stack.

Sulfur Trioxide in Soot

Soot deposited in the flues of oil fired boilers frequently contains sufficient sulfur trioxide to rot clothing. As long as the boiler is in operation, the temperature is sufficiently high to prevent absorption of moisture by this anhydride, but as soon as the boiler is taken off the line, this sulfur trioxide will absorb water from the air and corrode the iron. For this reason, boilers which are operated intermittently should be blown free of soot when taken off the line.

GOULDS

Hand Rotary Pump for Fuel Oil Systems

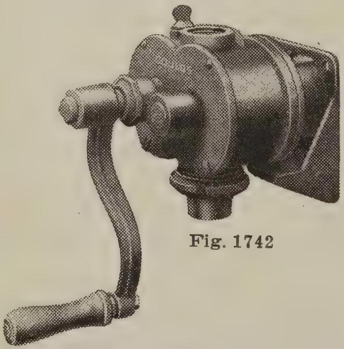


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings.

Furnished with or without bracket for attaching pump to side wall.

Capacity—10 gallons per minute.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. **Seneca Falls, N. Y.**

Atlanta Chicago New York Pittsburgh
Boston Houston Philadelphia Washington

THE ever increasing number of satisfied owners—the ever increasing number of money making distributors—are responsible for our ever increasing success.

We would be pleased to receive applications for territory from reputable firms or individuals in localities where we are not now represented.

BURNOIL
AUTOMATIC
HOME HEATING SYSTEM

Manufactured by

Burnoil Oil Burner Corporation

56-58 West 45th Street
New York City

THE PLACE OF FURNACE OIL IN THE OIL INDUSTRY

(*Continued from page* 30)

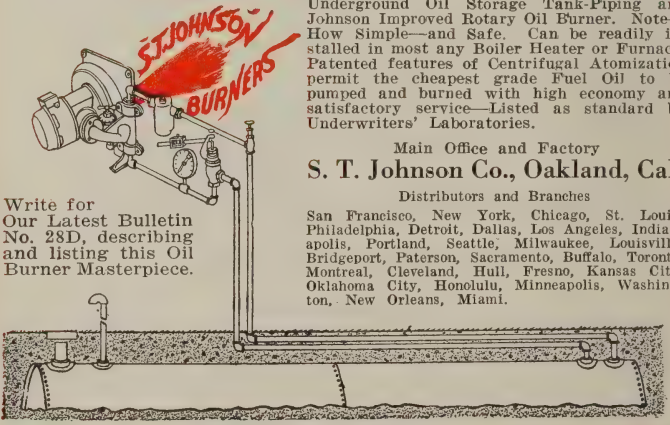
boiling point range depend upon the burner in which it is to be used. For some atomizing burners, a 24 gravity product of relatively high boiling points has been used satisfactorily. But some vaporizing types of burners are using a product of 340°/360° F., Initial, 15-18% off at 392° F. and 520°/550° Final. To summarize on this phase, the boiling point range of furnace oil is of real importance to the vaporizing type of burner and in these cases it must be suited to the particular burners in which it will be used, the limits being determined by actual experience.

The manufacturers of oil burners not capable of handling a furnace oil of wide range in specifications have in some cases got into trouble by sending their burners to various parts of the country and recommending a certain gravity of furnace oil just because that gravity of furnace oil supplied to them at their own factory was satisfactory for their burner.

Color unfortunately has been emphasized in some localities. Of course, the color of furnace oil in itself is of no importance, and it would be an economic waste if the furnishing of any particular color should increase the cost or limit the range of available products.

I do not know of any otherwise suitable product commercially made today which must be eliminated

Improved Rotary Type 22



This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—and Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

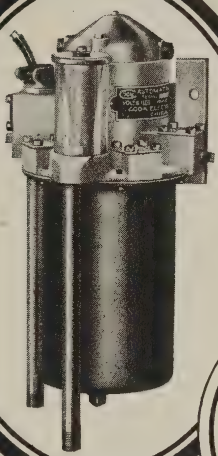
Main Office and Factory

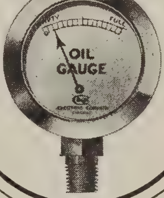
S. T. Johnson Co., Oakland, Cal.

Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Paterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.

Write for Our Latest Bulletin No. 28D, describing and listing this Oil Burner Masterpiece.





Cook
Pumps and Gauges

Cook Pump

The pump automatically delivers oil to the burner only at such time and in such quantities as the burner requires the oil. There is never more than a gallon of oil in the basement at any time. Cook pumps are reasonable in price, economical to operate, noiseless and entirely automatic.

The Cook Oil pump is a bellows type pump. It contains no packing. It is positive and reliable in its operation. It is easily installed, noiseless and operates at a cost for current of less than 20 cents per 1000 gallons.

Cook Gauge

The Cook Hydrostatic gauge for buried oil tanks measures the quantity of the oil in either an inside or outside tank. It is operated by the pressure of the liquid on the diaphragms. This pressure is transmitted by a liquid in the small copper tube to the indicating gauge. To install, drop the operating diaphragms to the bottom of the tank through the 2-inch pipe hole. Insert the 2-inch reducing bushing that is threaded on the transmission tube and screw down the packing nut. The gauge mounts 2 feet above the storage tank any place within the length of the copper tube. This hydrostatic gauge is strongly built, compact, accurate and easily installed.

Folder fully illustrated upon request.

Cook Electric Company

2700 Southport Ave. Chicago, Ill.

from consideration by reason of its sulphur content.

Some objections have been raised in connection with the odor of certain furnace oils. In any properly designed and installed system, I feel that any natural inherent odor of an otherwise suitable furnace oil is not a legitimate objection.

The viscosity must be such as to permit furnace oil being readily handled through comparatively small lines at a temperature which sets a very definite limit and rules out all heavy fuel oils.

The question of Cold Test is also of importance and is also to some extent a limiting factor. It is not practicable in household heating to provide for heating the oil, and this condition arbitrarily rules out of consideration those products of such Cold Test and viscosity which require heating. This is a limitation which the burner manufacturer cannot be expected to overcome.

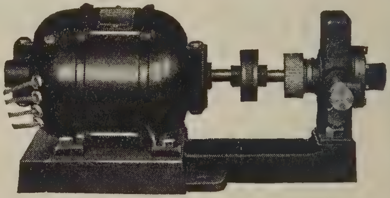
Finally, furnace oil must not contain sufficient moisture or sediment to interfere with the operation of the burner. No unreasonable limits on this point are required by the average burner.

(*Continued in the April issue*)

Londoner Patents Furnace

A new oil-fired furnace which recently has been placed on the market was developed by William H. Owen of London. The furnace consists of a burner and an air-heater heated by the waste gases of the furnace. The highly-heated air from the heater is supplied to an inner zone surrounding the burner.

This is the "PAUL" Type "RRO" Revolving Reciprocating Pump For Oil Service



A new type of pump especially designed to handle fuel oil of any gravity in common use, and to meet the peculiar conditions characteristic of a special service in the proper and most efficient way. Double acting piston of positive displacement. Positive acting. The "PAUL" type "RRO" Revolving Reciprocating Oil Pump is capable of working against a high suction lift, can be run at high speed, is quiet and self-priming.

The "PAUL" type "RRO" Revolving Reciprocating Pumps make the best oil burner installations better and more reliable.
Let us send You Bulletin and Data today.

FORT WAYNE ENGINEERING & MANUFACTURING CO., INC.
Main Office and Factory, Ft. Wayne, Indiana
See this pump at the American Association of Oil Burner Manufacturers Convention, Chicago

Twelve reasons why ABC is the leading oil burner

1. Quiet ABC is really quiet. Allowances are not made after installation.

2. No Carbon or Soot Engineers know what an immense advantage this is.

3. Less Oil Required Unique means of atomization assures complete combustion. Every particle of oil is burned. The heat rises slowly and is completely absorbed by the boiler.

4. Longer Boiler Life Circular flame, evenly applied all around the boiler, greatly increases its life.

5. Burns Low-priced Oils ABC burns gas oil and fuel oil.

Odorless An ABC heated home is odorless.

7. No Unsightly Parts Outside of Boiler This ABC feature has made sales.

8. Simple Only one moving part subject to wear.

9. No Fan or Blower Heat is not blown up the chimney and wasted. No noisy fan introduces ABC to your guests.

10. Clean It's useless to say how clean ABC is. You must see to appreciate.

11. Automatic Heat when you want it—as you want it.

12. Oil Burned in Suspension.

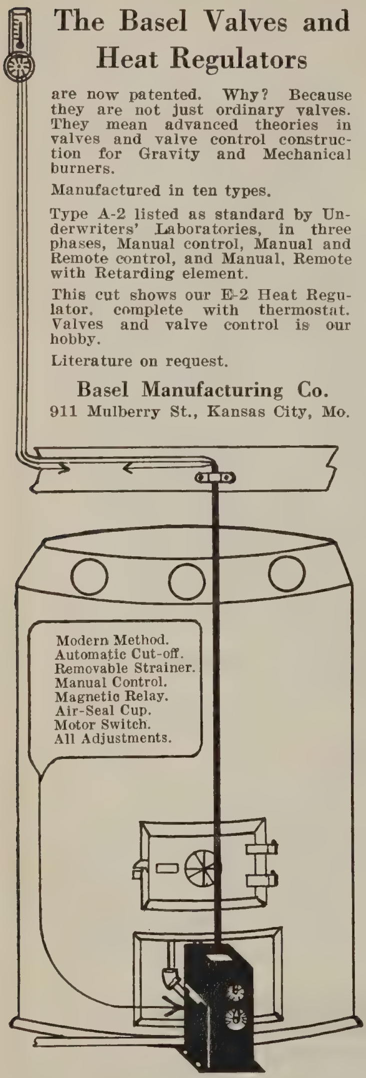
Executives Wanted

to open exclusive sales agencies

Men with sales or organizing ability, men with capital to invest, there is no industry with so rich a future as the selling of oil burners. An ABC exclusive agency is worthy of your earnest consideration. Let us send you the facts.

AUTOMATIC OIL BURNER CORPORATION
312 NORTH MAY STREET CHICAGO

ABC OIL BURNER
no noise – no carbon


Modern Method.
Automatic Cut-off.
Removable Strainer.
Manual Control.
Magnetic Relay.
Air-Seal Cup.
Motor Switch.
All Adjustments.

The Basel Valves and Heat Regulators

are now patented. Why? Because they are not just ordinary valves. They mean advanced theories in valves and valve control construction for Gravity and Mechanical burners.

Manufactured in ten types.

Type A-2 listed as standard by Underwriters' Laboratories, in three phases, Manual control, Manual and Remote control, and Manual, Remote with Retarding element.

This cut shows our E-2 Heat Regulator, complete with thermostat. Valves and valve control is our hobby.

Literature on request.

Basel Manufacturing Co.
911 Mulberry St., Kansas City, Mo.

Oil Fuel for a Century

A lack of oil fuel should not be anticipated for 100 years, according to H. L. Horning of Waukesha, Wis., in his speech on the occasion of his recent election to the presidency of the Society of Automotive Engineers. He also stated that the quality is assured provided the petroleum industry can meet the economic side of the question.

Fire Cause Figures Hold Lesson on Installation

The importance of correct installation and proper maintenance of oil burning equipment is very well illustrated by the statistics regarding oil burner fires during the year 1913, compiled by the National Fire Protection Association.

The causes of the few small blazes occurring during that year are as follows:

Feed pipes, 30. Of these, 21 were due to the breaking of pipes, 5 to leakage of feed pipe, one to repairs on pipe due to clogging and others to some form of clogging or breaking.

Valves, 5. Of these 3 were valves that broke or blew out and two were defective valves allowing oil to escape.

Burners, 7. Defective or broken burners, 3; clogged burners, 3; fracture at connection of burner to pipe, 1.

Valves accidentally opened or left open by mistake, 2; blower troubles, 3.

Starting troubles, 5; of which 2 were due to burner being opened too wide and 2 to pump being

SWORD

For
Dealers

Oil Burner Facts of Vital Interest

TWO vital advances have revolutionized home heating with oil: "Gun and Target Atomizing" and "Combustion-Gas Vaporizing."

The Sword Automatic Oil Burner, combining these, sells and serves in a way altogether new to the oil burning field: silent as a coal fire; clean as illuminating gas; burns a 20% cheaper oil; 20% less oil; cheaper to install; does away with costly "service."

Three years in use; sales rights allotted in many localities; distribution progressing rapidly. Write now for facts and demonstration.

Dealer Information Immediately Available

Sword & Kimber Company

4861 Stenten Avenue
PHILADELPHIA, PENNA.

started before ignition took place.

Miscellaneous escape of oil, 6. Miscellaneous causes, 6.

The following fire record was compiled by the National Fire Protection Association in July, 1918:

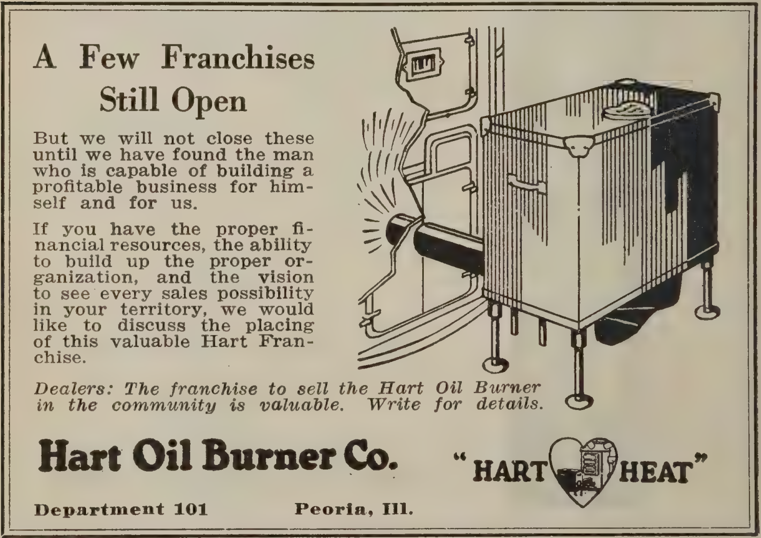
Causes	No. of Fires	Per Cent
Broken pipes	26	25.5
Broken and defective fittings and valves	12	11.7
Carelessness with valves	11	10.8
Overheated oil furnaces	7	6.9
Miscellaneous carelessness	7	6.9
Broken and defective burners and burner connections	5	4.9
Leaking pipes	5	4.9
Sparks or flames from oil furnaces	5	4.9
Explosions in furnaces	4	3.9
Clogging of pipes, obstructions to burners	4	3.9
Oil getting into air pipes	3	2.9
Defective or improperly installed tanks	3	2.9
Explosions in tanks	2	2.0
Oil soot ignited in flue	1	1.0
Data lacking	7	6.9
Total	102	100.0

Will Supply Fuel Oil to Lake Steamers

An oil storage and supply plant is being constructed in the harbor industrial area of Toronto, Canada, by the Imperial Oil Company, Ltd. It is the intention of this company to spend $500,000 in equipment for the supply of fuel oil to lake vessels, many of which are now making this port on the trip from the upper lakes to Montreal.

Federal Controls Made Standard

Federal mercoid controls for oil burners are now listed as standard by the Underwriters Laboratories, Chicago, according to a recent announcement by the Federal Gauge Company, also of Chicago.



A Few Franchises Still Open

But we will not close these until we have found the man who is capable of building a profitable business for himself and for us.

If you have the proper financial resources, the ability to build up the proper organization, and the vision to see every sales possibility in your territory, we would like to discuss the placing of this valuable Hart Franchise.

Dealers: The franchise to sell the Hart Oil Burner in the community is valuable. Write for details.

Hart Oil Burner Co. "HART HEAT"

Department 101 **Peoria, Ill.**

Oil Burner Ignition

When you are in Chicago attending the 1925 Oil Burner Convention, plan to discuss your Ignition Problems with us.

Also, you are cordially invited to visit us at our factory.

Jefferson Electric Mfg. Co.
505 S. Green St. Chicago, Ill.

Manufacturers of

- *Gas Furnace and Oil Burner Transformers and Ignition Equipment.*
- *Bell Ringing Transformers.*
- *Sign Lighting Transformers.*
- *Heavy Duty Signal Transformers.*
- *Auto Transformers.*
- *High Voltage Transformers.*
- *Welding Transformers.*
- *Automobile Ignition Coils.*
- *Jump Spark and Make and Break Coils.*
- *Testing Instruments.*
- *Toy Transformers.*
- *Radio Transformers.*

Jefferson Electric
Ignition and Control

Fuel Oil Production Continues Rise in December

By C. A. Hall

A NEW high level in production and demand for gas and fuel oils was reached during December and the influence of the noticeable increased runs to stills, started in the fall, shows in the record figures.

December production and domestic demand were 1,199,000,000 gallons and 1,104,000,000 gallons respectively. Domestic demand increased 91,000,000 gallons as compared to an increase in production of only 65,000,000 gallons. Stocks were increased 30,000,000 gallons. A new high level being reached December 31, 1924, with 1,671,000,000 gallons.

During December 284 refineries, with an aggregate daily capacity of 2,345,927 barrels, had crude runs of 57,880,491 barrels, of which all but 3,306,378 was domestic crude oil. This represents the greatest monthly total ever recorded and is reflected in record production figures for the three main products—gas and fuel oils, kerosene and gasoline.

Among the noteworthy changes in production during 1924, in contrast to 1923, was the considerable decreased output in California, Wyoming and Louisiana with smaller losses in Illinois, Indiana, Kentucky, Ohio, Pennsylvania, Tennessee and West Virginia with increased output in Oklahoma, Arkansas, Texas, Colorado, Kansas, New York and New Mexico. The decrease in California, in spite of new developments, amounted to about 33 million barrels. In Wyoming, the Salt Creek Pool with a peak daily production in January, 1924, of 112,400 barrels, dropped to less than 50,000. The decrease is expected to stop with the finding of oil at deeper levels.

The year 1925 has opened well for the past two months and there is a general feeling of optimism in the oil industry. It is expected, however, that production will continue to drop until warm weather permits increased drilling activities. Stocks of fuel oil will likely continue to be drawn on until late in the spring or early summer. Judging by the stocks at the end of 1924, as compared with the figure for the end of 1923, production topped demand by 150,000,000 barrels during the year.

Comparative analysis for December 1924 and 1923 is shown below:

GAS AND FUEL OILS

	Production	Imports	Exports*	Stocks End of Period	Domestic Demand
Dec. 1923	1,073,337,053	43,828,202	149,725,898	1,515,034,711	952,330,167
Dec. 1924	1,199,093,235	46,189,123	111,988,496	1,670,508,938	1,103,874,893

---

*Exports include shipments to Alaska, Hawaii and Porto Rico.

Known
The Wide World Over
and
on the Seven Seas

10,000 Ray Burners
Now Operating in
All Parts of the World

A Mechanical Masterpiece
That

Burns Cheapest Grades of Fuel Oils

Made in over 30 Different Sizes and Types

See Our New **Baby Burner** For Homes

In Full or Semi-Automatic Types

DISTRIBUTORS AT

Boston
New York
Philadelphia
Baltimore
Washington
Atlanta
Louisville
Jacksonville
Providence
Hartford
Bridgeport
Cleveland
Detroit
New Orleans
Kansas City
St. Louis
Omaha
Dallas
Houston
Des Moines
El Paso
Minneapolis
Great Falls
Seattle
Portland
Chicago
Vancouver
Toronto
Los Angeles
Sioux City
Mexico City

W. S. RAY MANUFACTURING CO.

722 So. Michigan Ave.,
Chicago, Ill.

120 New Montgomery St.,
San Francisco, Cal.

Your customer wants to know how much oil he receives, burns and has on hand.

A Pneumercator Tank Gauge

mounted on the wall wherever desired and at any distance from the tank, will give him this information.

Write for Literature

PNEUMERCATOR COMPANY, INC.

40 Flatbush Ave. Extension
Brooklyn, N. Y.

ELECTRICAL AND GAS CONNECTIONS IMPORTANT PART OF INSTALLATION

(*Continued from page* 28)

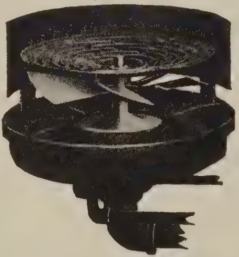
necessary for this type of work. Cut-out boxes should be used for the electrical work as required.

Each job should be grounded with standard ground clamps and each joint must be properly soldered and double taped with rubber and friction tape in accordance with standard regulations. Clamps on the B. X. should not be more than eighteen inches apart. The B. X. itself should never have sharp bends in it, the curves or corners having a radius of at least two inches. When it is necessary to cut the armored covering, care should be used to see that no sharp ends are pressing against the insulation and that the insulation has been undamaged where the wiring comes through the B. X. end connectors.

It is essential that there be no loose connections. B. X. should be run along the ceiling from the square "D" box in the shortest practical distance, meeting the gas line over the burner and following the gas line to the burner.

Extinguisher for Home Use

The Foamite-Childs Corporation, Ithaca, N. Y., have placed on the market a small fire extinguisher, in a one and one-half gallon standard size, for home installation. It delivers 8 times its volume in foam, when discharged, according to George W. Lee, sales manager.



The Rotary Oil Burner

is designed for use in steam and hot water heating systems, hot air furnaces, water heaters, ranges, etc. It produces maximum furnace efficiency by vaporizing the oil and mixing the oil-gas with the proper amount of oxygen, at the point of combustion. Uses fuel distillate of 27 to 36 gravity.

Rotary Manufacturing Company
1526 Santa Fe Avenue Los Angeles, Calif.

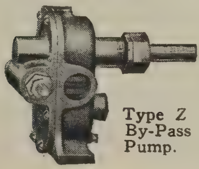
Eastern Manufacturer, 1934 Market St., Philadelphia, Penn.
Established 1908 Handled by distributors
Chicago, St. Louis, San Francisco, Oakland and others

Oberdorfer Pumps

For Fuel Oil Burners

THE Oberdorfer Bronze Pump with by-pass (Type Z) is specially adapted to feed any given quantity of fuel oil to the combustion chamber. The metering is governed by an adjusting screw and controlled by a thermostat.

The by-pass inside the pump relieves all overflow and does away with the necessity of a return line. The automatic float switch guarantees an even flow.



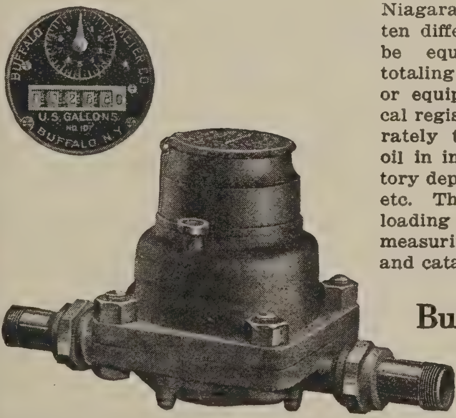
Type *Z*
By-Pass
Pump.

Sturdy all-bronze construction. Simple working parts—non-leakable.

Write for catalogue "K" and name of nearest dealer.

M. L. Oberdorfer Brass Co.
Syracuse, N. Y.

NIAGARA OIL METERS



Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.
2926 Main St.
Buffalo, New York

BOOKS

of special significance to anyone interested in oil burning.

Burning Liquid Fuel

By William Newton Best

$4.00

A practical treatise on perfect combustion of oils, giving analyses, calorific values and heating temperatures of various gravities with information on design and proper installation of equipment for all classes of service.

Fuel Oil and Steam Engineering

By Robert Sibley and C. H. Delany

$5.00

An unusually complete treatment of fuel oil, for the central station man, the power plant operator, the mechanical engineer and the student.

Oil Fuel for Steam Boilers

By Rufus T. Strohm

$2.00

Describing the principles that underlie the use of oil as a fuel in steam boiler practise; the form and action of various types of burners; arrangement of furnaces for burning oil under different kinds of boilers; the operation of accessories such as pumps, heaters and cleaning devices; the methods of storing oil.

Industrial Uses of Fuel Oil

By F. B. Dunn

$3.00

Practical exposition of the use of fuel oil for industrial purposes, giving much specific information received through first hand experience.

Liquid Fuel and Its Apparatus

By William H. Booth

$4.00

Descriptions of various systems and apparatus; information on petroleum production and handling; and explanations of combustion principles and theories.

Prompt Attention Is Given to All Orders.

Check should accompany order.

FUEL OIL

for Heat and Power

350 Madison Ave. New York City

New Company Making Small Burners

A small pamphlet has been issued by the Vaporized Oil Burner Company, Detroit, Mich., describing its new natural draft burner, the "Voco." It is small enough to be used in either a cooking range or a base burner or stove of similar size, and is not intended for use in a furnace. It burns kerosene and is based on the preheating, gas generating principle.

Firm Changes Name

According to a recent announcement, the title of the Boston Auto Gage Company has been changed to The Boston Auto Gage Company, and the company has moved from its old address at 248 Boylston Street, Boston, to larger quarters at 28 Clapp Avenue, Pittsfield, Mass.

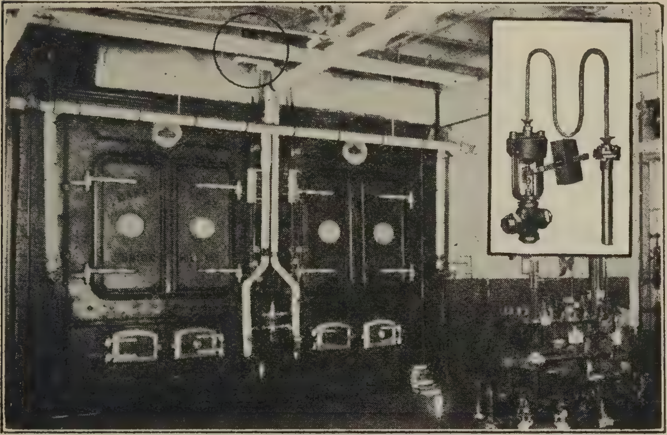
Hydrotator Acquires Patents

According to a recent announcement, the Hydrotator Company, a newly formed corporation, has acquired the patents and engineering of L. C. Trent, who has been operating at the L. C. Trent Engineering Company in Philadelphia, Pa.

M. K. T. Buys Mid-Continent Oil

The Missouri, Kansas, Texas Railway Company has closed fuel oil contracts for 1925 and 1926, with fifteen Mid-Continent refiners, thus replacing the contract with the Mexican Petroleum Company, which expired last year.

Illustration shows Sylphon Temperature Regulator installed on Secondary Heater. The installation by Petroleum Heat & Power Co. is in a prominent New York City Hotel.



SAFETY is what Underwriters and Fire Boards stress
YOU can get it in this easy way

Here is a Fuel Oil Installation that is safe. Safe, because in addition to the downright efficiency of the installation, there is installed on the oil supply tank a Sylphon Temperature Regulator.

Installed on the oil supply tank, Sylphon Temperature Regulators, by automatically regulating oil to a temperature of (nominally) 100° to 110° F., guard against the generation of gases in tank and make for easy pumping and big steam savings.

Installed on Secondary Heaters, by keeping oil at (nominally) 150° to 160° F., they deliver it at the most efficient atomizing temperature.

Sylphon Temperature Regulators are entirely self-contained, and use as their expansion member the famous Sylphon Bellows. Made without soldered seam, its extreme sensitiveness and flexibility guarantees widest possible throw of valve and everlasting close and accurate regulation. Do not go another day without a copy of our complete Bulletin. Ask for ZTR 105.

Standardize with Sylphon for Safety

THE FULTON COMPANY, Knoxville, Tenn.

Originators and Patentees of the Sylphon Bellows

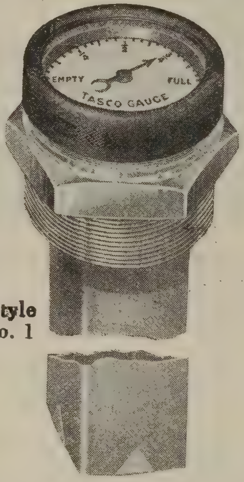
Sales Offices in: New York Chicago Detroit Boston Philadelphia
and all the principal cities in U. S.

European representatives:
Crosby Valve & Engineering Co., Ltd.,
41-42 Foley Street,
London, W. 1, England.

Canadian representatives
Darling Bros., Ltd.,
120 Prince Street,
Montreal, Canada.

"Tasco"
Gauges

are standard equipment on more than 50% of all Fuel Oil and Oil Burning devices on which gauges are used.



Style
No. 1

There are types for installation in ends, tops or sides of tanks—either with our standard flanges or with 1½ or 2 inch I P threads.

Send for complete information on different styles

The Akron-Selle Co.
"40 *Years in Business*"
Akron, Ohio

WHO USES FUEL OIL—HOW MUCH—WHERE?

(*Continued from page* 23)

States, probably aggregated 375,000,000 tons, of which about 47,000,000 tons was fuel oil. At this rate, fuel oil represents 12 per cent of all fuel consumed by the industries of the country, exclusive of the operation of railways and steamships.

Exhibit "B" shows graphically the percentage of various fuels consumed by our manufacturing enterprises for the year just ended. Bituminous coal naturally leads over all other fuels, constituting 63 per cent, while anthracite coal really occupies last place, being exceeded by gas, both natural and manufactured gas representing 6 per cent of all industrial fuels consumed. Fuel oil stands out prominently with 12 per cent, being nearly equivalent to coke, which fuel we know occupies an important niche in the field of industrial fuels.

On the basis of B. t. u. value, oil outranks all other fuels, as analysis shows that the average fuel oil contains about 19,000 B. t. u. per pound as compared with: Bituminous coal, 14,000; anthracite coal, 12,000; natural gas, 12,000; manufactured gas, 6,000. The value of gas is based upon the assumption that 10 cubic feet are equivalent to one pound of coal.

Exhibit "C" shows all of the most important consumers of fuel oil in the United States, arranged according to size of demand.

Ocean transportation, with a de-

Are You in Need of a Tank?

OIL BURNER—
GASOLINE—
STORAGE—

No matter what its size may be—its shape or use—
We make 'em and make 'em good.
Let's have your inquiries.

Write for literature

Lakeside Bridge & Steel Company

North Milwaukee, Wisconsin

Chicago Distributor

American Tank and Installation Company
1320 Burnham Building, 160 N. La Salle Street
Phones: Central 6841, Sheldrake 3544

mand of 65,000,000 barrels, leads the field. The paramount advantages of fuel oil have been thoroughly proved in our navy, merchant marine and in the operation of our large ocean liners. Oil is supreme as fuel for ocean transportation and has made possible the speed and efficiency of such great ocean liners as the Leviathan. Railroads, with a demand of 55,000,000 barrels, are the second largest consumers of fuel oil in the country. Electric power plants occupy third place with a demand of 50,000,000 barrels and singularly enough, petroleum refining, the industry producing fuel oil, uses 41,000,000 barrels, or about 12 per cent of its own output. Gas manufacturing, with 32,000,000 barrels representing gas oil exclusively, is the fifth largest consumer. As this gas oil is converted into manufactured gas, we see in this instance where our product serves a double purpose, as Exhibit "B" shows that 2 per cent of all industrial fuels used represents manufactured gas.

Shows Monthly Consumption

Exhibit "D" shows the monthly consumption of fuel oil in the United States for January and July of each year, from 1918 to July, 1924, and for each successive month to the end of the past year.

A glance at the chart shows a consistent growth over this period of seven years and lends little doubt as to the future of such a healthy demand. Each year sees the addition of many new fuel oil consumers, while others show increase in demand.

TANKS

OBROUND TYPE
Also DUPLEX and
CYLINDRICAL TYPES
All Sizes—Write for Prices
KAUSTINE CO., Inc.
Buffalo, N. Y.

Rare Business Opportunity

For Sale: A complete stock and equipment for the manufacture for an entirely automatic oil burner, suitable for use in home heating plants, together with rights in patent. Will sell for cash payment and royalty, or outright. Burners are mechanically correct as shown by four successful seasons of operation. Address all inquiries to Box "W" c/o Fuel Oil, 350 Madison Ave., New York, N. Y.

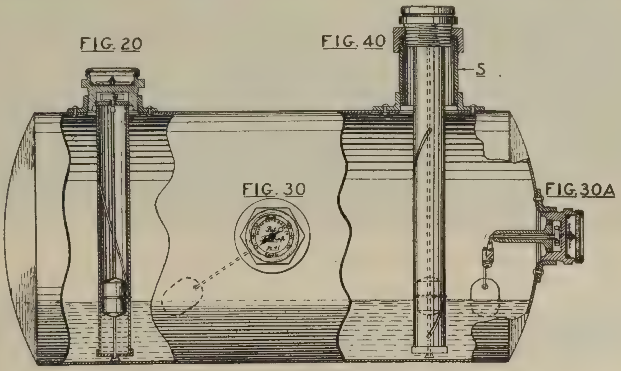


Fig. 20, Triumph No. 26 O. B. Upright gage, shown in section.

Fig. 30, Triumph Jr., No. 41 gage, applied to side of tank.

Fig. 40, Adaptation of Triumph No. 26 O. B. gage for storage tanks buried underground.

Fig. 30A, Triumph Jr., No. 41 gage shown in section, applied to dome end of tank.

"Triumph"

Magnetic Oil Tank Gages

are

Durable—Dependable—Safe

The indicating pointer on all models of the "Triumph" is a compass needle which is revolved by the turning of a magnet under a solid diaphragm. This makes the gage absolutely safe for use below the level of the fluid, for even if the glass becomes broken there is no opportunity for either the fluid or fumes to escape.

An actual test by the Underwriters' Laboratories showed that a pressure of 1500 pounds was necessary to cause a rupture of the diaphragm.

Eighteen years of gage manufacturing experience have gone into the perfection of this gage.

Write for details of Model Jr. No. 41 and Model 26 O. B., which are special designs for oil burning equipment and are listed as standard by the Underwriters' Laboratories.

The Boston Auto Gage Company

28 Clapp Ave. Pittsfield, Massachusetts

Class in lecture room in new fuel oil school

Establish New Fuel Oil School on Pacific Coast

SUCH very good results have been obtained from the fuel oil school for marine engineers of the United States Shipping Board that has been conducted at the Philadelphia Navy Yard alternate weeks during the last two years, that a similar school was started recently at the Mare Island Navy Yard, California, in order to offer the same course of instruction to Pacific Coast engineers. To date about 100 engineer officers have attended the new school, which is under the supervision of Lieutenant Rasch, U. S. N.

While the school was established primarily for engineers on Shipping Board vessels, private ship operators have been extended the privilege of sending their engineering personnel. The course lasts but five days, with lectures and laboratory work each day.

Courtesy Marine Engineering & Shipping Age

Laboratory work. Bricking for oil burning installation

Gill

AUTOMATIC

Oil Burner

Sheer merit is the basic reason why heating engineers strongly recommend the Gill Automatic Oil Burner and why the Gill distributorship is most profitable.

Simple in construction—positive in operation, Gill Automatic Oil Burners give complete satisfaction.

You do not have to spend your profits servicing a Gill Burner.

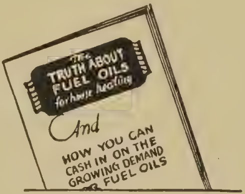
Gill Manufacturing Co.

8300 South Chicago Ave.
Chicago, Illinois

Write for details of our selling franchise

"The Truth About
FUEL OIL
for House Heating"

*—An Empire Contribution
To a Growing Industry*


The TRUTH ABOUT FUEL OILS for house heating
And HOW YOU CAN CASH IN ON THE GROWING DEMAND FUEL OILS

After having made a wide investigation of the domestic, househeating market for fuel oil, we have published our conclusions in a handy little booklet entitled, "The Truth About Fuel Oil for House Heating."

This little booklet is already in its second edition and has created a great deal of interest among oil men and burner men all over this country and in many other parts of the world.

You are invited to write our Tulsa office for a copy now. There's no obligation.

CITIES SERVICE OILS

ONCE-ALWAYS

EMPIRE REFINERIES, Inc.

Subsidiary Cities Service Co.

General Offices, Tulsa, Oklahoma

Offices: New York, Philadelphia, Cleveland, Chicago, St. Paul, Atlanta, New Orleans, Kansas City, St. Louis, Ft. Worth

Consulting Page

Editor, FUEL OIL:

Noticing the query of A.W.L., St. Louis, Mo., in the January issue of FUEL OIL relative to the rumbling of natural draft burners, I would like to say that I have had the same trouble. As I have had some experience with both mechanical and natural draft burners working both singly and in combination, I have reached some conclusions in this matter.

From observations and tests made by myself with a natural draft burner made here in the East I will say that I agree with C. C. Brierly, as my investigations seem to bear out his statements.

Where a natural draft burner is installed and adjusted to the local draft conditions, it has to be adjusted to conform to these conditions at both maximum and minimum flames. We will say that the burner is adjusted on a certain day, and, that a week later there is trouble. Investigation thereof leads to a readjustment of flame conditions. Why? Weather conditions are changed causing a different draft condition within the flue. The outside air is several degrees colder, which makes the balance of heated gases and the outside temperature greater and as a result we have a stronger draft within the flue or chimney that causes a stronger pull on the burner. Most natural draft burners have a fixed air register or intake. This is capable of handling a certain amount of air. As we all know, we have to have a certain volume of air to handle a certain amount of oil or oil gas. A natural draft burner is usually set from the standpoint of the minimum flame. At this point the draft of the heated gases create a draft through the air registers that supplies the required amount of air for combustion. Increase the flame and the amount and temperature of the heated gases increase with the result that there is a greater draft of air through the air registers. Consequently as with most natural draft burners the air registers are of a fixed type, there is a certain point where they are working at their maximum efficiency. When the draft conditions are such that there is a greater pull on the burner or flame of the burner there is created a partial vacuum within the combustion chamber or firepot of the heater of whatever type it may be. As a result of observation I have found that the flame has a slight tendency caused by this partial vacuum to fluctuate and vibrate. Since the air is not entering the combustion chamber to maintain a steady and sufficient supply of oxygen for the proper combustion the flame sets up panting, causing the rumbling referred to. As the flame lessens slightly the air rushes in through the air intake and supplies the required amount of oxygen which will allow the flame to again reach the maximum point. This is repeated as the oxygen of the air is exhausted and replenished. When the door of the combustion chamber is opened we allow a surplus amount of air to enter and so create a balance of oxygen and oil gas. This will be also noted by the change in the color and action of the flame. In one test where I had quite a little trouble in this line I found that the flame at the maximum point failed to get the required amount of oxygen to such extent that on first opening the slide of the fire door a slight distance there was a decidedly strong suction that made quite an audible noise until the proper balance was maintained. In this case it was necessary to run the burner with the door slide slightly open or the door on the latch. Under these conditions when the flame was at the minimum point there would be some excess air varying according to the amount of air that was admitted. In case of hot air heating equipment the slightest vibration or noise will be greatly magnified irrespective of the source thereof.

N. S. C., Springfield, Mass.

Editor, **FUEL OIL:**

I am anxious to gain facts about oil heating in regard to power supply, generating electricity, etc. There are so many prospects here among various types of industries and, although they buy the poorest grade of soft coal, they pay the average price of $6.50 per ton for it. What books would you recommend to me that will give me comparisons—actual tests—on how to lay out complete installations for installing burners in various plants. Is there a course designed by any institute? Your advice will be appreciated as is already your excellent publication. J.D.W., Charlotte, N. C

For the books, see the question and answer above. Courses in oil burning theory and practical work are being given at this time, we understand, by the Brooklyn Polytechnic Institute,

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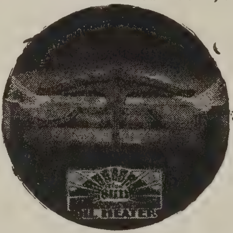

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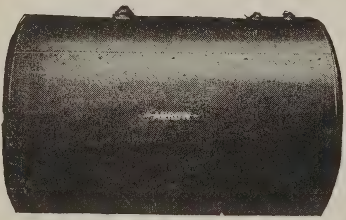

The Novelty Steam Boiler Works Co.
929 S. Howard St., BALTIMORE, MD.

Brooklyn, N. Y., New York University, the Todd Oil Burner Corporation, the Williams Oil-O-Matic Heating Company, Bloomington, Ill., the Hayes Research Institute, Chicago, and the United States Shipping Board, which, of course, specializes on instruction for marine installations rather than industrial installations. There are other schools of instruction in oil burning, but these are the only ones we have definite information on.

Q. What is the flash point of the 28-36 degree Baume fuel oil sold by the Standard Oil Company of New York at South Norwalk, Conn.? On page 15 of your February issue it is intimated that fuel oil is not approved by the National Board of Fire Underwriters' Laboratories. Is this correct? If so, why does the same Board give its approval to the Caloroil burner which, according to its advertisement, uses 28 degree Baume gravity oil?
H. S., Stamford, Conn.

Ans. The local office of the Standard Oil Company of New York assures us that the furnace or fuel oil it markets in New England has a flash point of over 150 degrees Fahrenheit, which is the specification required by the state laws of New York.

The statement referred to was contained in an article by C. H. Chalmers. He wrote: "It is interesting to comment that no burner for domestic use has ever been approved by the National Board of Fire Underwriters to use any heavier grade of oil than gas oil."

The Underwriters are always conservative and sure to be on the safe side, hence they withhold their approval from any oil heavier than gas oil, but they do not condemn the heavier oils. Certain burners, including the Caloroil, can operate successfully and safely with heavier oil, but some burners cannot.

We do not know what gravity Mr. Chalmers had in mind when he used the term "gas oil" but it is perfectly possible that the two actions of the Board can be reconciled, for some oils with gravities as low as 24, 26 and 28 Baume are known as gas oils. It is probably one of these that is recommended for use by the Caloroil manufacturers. Ordinarily, however, gas oils average from 30 to 36 Baume gravity.

Q. Please recommend a few books on fuel oil which deal with the mechanical side of burning, such as piping layouts, type of oil pump and pressure required, etc. E.H.F., Jackson, Mich.

Ans. Two of the best books on the subject are "Fuel Oil and Steam Engineering" by Robert Sibley and C. H.

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Practically every oil company in the United States is listed in the January issue of **THE PETROLEUM REGISTER.**

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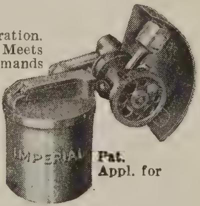

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Angle and Globe Needle Valves

Write for catalog of sizes and prices.

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1224 W. Harrison St. Chicago, Ill.

Delaney, and "Oil Fuel for Steam Boilers" by Rufus T. Strohm. Both may be obtained from FUEL OIL, the former for $5 plus postage and the latter for $1.50 plus postage.

Q. What manufacturers, if any, specialize on a furnace especially adapted for oil burners? A.N.S., Minneapolis, Minn.

Ans. The Monitor Boiler Works, Philadelphia, Pa., and the Meyer Furnace Company, Peoria, Ill., both make furnaces specially designed for oil burners.

Editor, FUEL OIL:

We note on Page 44 of the February Issue of FUEL OIL, that mention was made of the Breese Engineering Corporation developing a gas pilot light for oil burners. This is a natural mistake for you to make, but in order that you will have the correct information, what we are developing, is an oil pilot light, which can be used on any kind of oil burner.

Yours very truly,
Breese Engineering, Inc.
By J. L. Breese, Jr.

Editor, FUEL OIL:

We notice an article on page fifteen of your February issue that Mr. C. H. Chalmers makes the following comment: "It is interesting to comment that no burner for domestic use has ever been approved by the National Board of Fire Underwriters to use any heavier grade of oil than gas oil."

May we call your attention and Mr. Chalmers' attention to the fact that the "Hart" burner is approved by the National Board of Underwriters to burn oil of 30 gravity, and if we have not been misinformed on the definition of fuel oil, 30-32 gravity comes in this class.

For your further information it will interest you to know that here in Detroit we are actually burning 24-26 gravity on one or two jobs with the "Hart" burner.

Yours very truly,
Oil and Electric Heater Co.,
Vernon E. Vining, Sec'y and Treas.

An oil of 30 to 32 gravity is gas oil and not fuel oil, in the current trade use of the term. This accounts for Mr. Chalmers' statement.

Of course there are a number of burners that use lower gravity fuel, but Mr. Chalmers' statement referred only to the fuel approved by the Underwriters Laboratories for the burner.

Of course the whole question of gravity as an index to the quality of the oil is very unsatisfactory. One gravity and one locality means a very different thing from the same gravity in a different part of the country.

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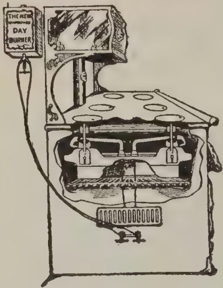

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A.A.O.B.M. CONVENTION LOOMS AS BIG EVENT OF YEAR

(*Continued from page* 11)

railroad fare, on the "certificate plan," will make a saving of one-fourth available to all those who attend.

Interesting Exhibits Planned

Some unusually interesting exhibits are being planned by the various companies holding booth reservations. Manufacturers of auxiliary equipment are in the majority on the exhibitor's list, which also includes several burner firms and one manufacturer of refractories. The list, complete to February 15 follow: Cook Electric Company, Chicago; **Fuel Oil for Heat and Power;** Hart Oil Burner Company, Peoria, Ill.; Leader Iron Works, Decatur, Ill.; Basel Manufacturing Company, Kansas City, Mo.; Home Appliance Corporation, St. Louis, Mo.; S. T. Johnson Company, Oakland, Cal.; Plibrico Company, Chicago; American Blower Company, Detroit; Chicago Steel Tank Company, Cicero, Ill.; Fort Wayne Engineering and Manufacturing Company, Fort Wayne, Ind.; Milwaukee, Tank Works, Milwaukee, Wis.; Minneapolis Heat Regulator Company, Minneapolis, Minn.; Honeywell Heat Regulator Company, Wabash, Ind.; Jefferson Electric Company, Chicago, Ill.; Reliance Gauge Column Company, Cleveland, Ohio; Jannette Manufacturing Company, Chicago.

These companies will make up what is expected to be one of the

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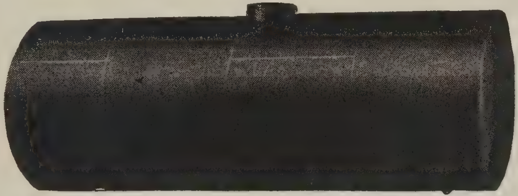

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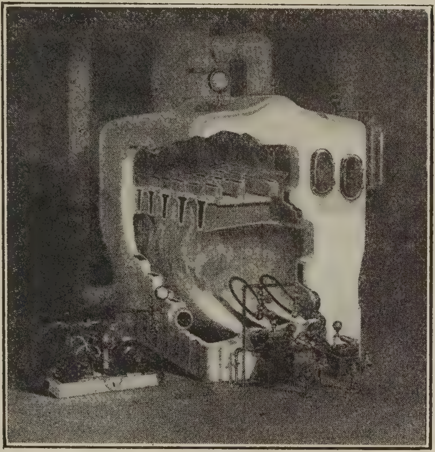
most complete and largest exhibits of oil burners and auxiliary equipment that has ever been shown. Several of them have double and triple size spaces in order to enable them to show their complete line of products. It is the desire of the officers of the association to make this convention one of the great milestones in the oil burning industry. Certainly, considering the exhibit, together with the program of speeches and reports, it promises to be the most complete and concentrated course in oil burning information, both technical and general, that has ever been offered.

Basel Control Listed by Underwriters

The Basel line of oil-burner valves and heat regulators are described in a folder that has been sent out by the Basel Manufacturing Company, Kansas City, Mo. One of the Basel contracts—the A-2—is listed as standard by the Underwriters' Laboratories for manual control with an automatic cut-off and for manual and remote control with automatic cut-off.

New Method of Baffling Is Illustrated

In an attractive booklet the Nuway Boiler and Engineering Company, Chicago, Ill., has illustrated the outstanding features of the Nuway boiler, so called, the booklet explains, because it embodies a new method of water circulation through the use of smaller and "open staggered" tubes and a new method of arranging baffle plates.



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Caloroil Burners are thermostatically controlled; automatic; simply and quickly installed; easily regulated and understood; made in standard sizes to handle up to 12,000 sq. ft. of steam radiation; cause no carbon, smoke or odor; use 28° Baume Gravity Oil; and have a special vacuum oil feed system—neither force feed nor gravity.

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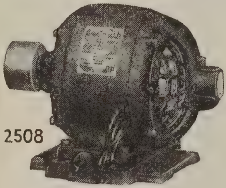

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To become affiliated with this organization as a Chalmers Agent offers a substantial profitable proposition to the right man.

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Chalmers Oil Burner Co.
Minneapolis Minnesota
Member of American Association of Oil Burner Manufacturers

PROPER INSTALLATION IS BIGGEST OIL BURNER PROBLEM

(*Continued from page* 16)

tell the final results.

Some of these purchasers may struggle through the season, but the majority are cured and cured quickly and are of the opinion that the oil burner is not a practical device yet. This must all be remedied, even at the cost of sales for the present, and certainly it should not bother any of us at this time. No one manufacturer is going to make and sell all of the oil burners sold. There will be plenty of business for everybody.

Competency Only Remedy

If every burner sold or installed properly was a success, no one firm at this time could begin to fill the demand, and even with conditions that exist at present some of us are now in that position. There is only one remedy and that is for every manufacturer to refuse to place an agency unless his product is going to be sold and installed by competent agents with a thorough understanding of how to install the burner.

As to burner sales direct to the consumer by mail, that is simply out of the question, and no manufacturer, even from a purely selfish viewpoint, looking to the future of his own company, would be so foolish as to do it. The industry is young and growing, and no one questions its future greatness; but that greatness will come much sooner if we go ahead carefully and on a solid foundation, and make an attempt to avoid making mistakes.

Double the Value of Your Advertising Dollars

The advertising pages of the April issue of Fuel Oil will be of double value to advertisers.

The Second Annual Convention of the American Association of Oil Burner Manufacturers will be held in Chicago at the Edgewater Beach Hotel, April 1, 2, 3.

The April issue of Fuel Oil will be a

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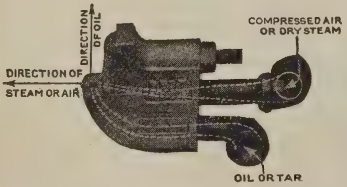

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THE HEATING VALUE OF OIL

(*Continued from page* 10)

per pound for fuel oil. Pound for pound, then, fuel oil has almost double the heat value of the best grades of anthracite coal.

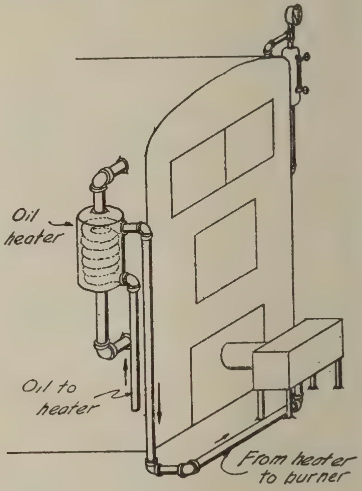

Figure 1

One simple, possible method of heating heavy oil so it might be used in domestic installations is shown in Figure 1. In No. 1 an ordinary small sized indirect water heater is attached to the hot water heating boiler, or below the water line of a steam boiler, if direct steam or vapor is the system of heating to be used. The oil pipe on its way to the burner is then connected to the lower inlet to the pipe coil, and the top of the coil, which serves as the oil outlet, is then connected to the burner. Operation of the heating plant then draws oil

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through the coil, where it is heated and the viscosity lowered to a point where the oil flows freely to the burner.

When a boiler is cold, of course, as for instance before firing up in the fall, there will be no reduction of viscosity of the oil passing through the heating coil. However, once the boiler has been fired, even should the fire go out over night, the water in the boiler would still be sufficiently warm in the morning to heat the oil to the required temperature for burning, and as soon as the heat is turned on the boiler again, the temperature of the water rises, thereby insuring the necessary pre-heating of oil.

By passing the oil upward through the coil, a counter flow is obtained. That is, the flow of the two fluids in the heat exchanges are in opposite directions. The water from the boiler coming in contact with coils conveying the comparatively cold oil, parts with some of its heat and thereby becoming heavier, flows to the bottom of the chamber, thence back to the boiler to be heated again.

This counter circulation brings the heating water when it is coolest in contact with that portion of the coils where the oil is coolest; and as the oil ascends through the coil it is in contact with a surface growing progressively hotter, until it reaches the very top, where the hottest water is flowing. This gradual heating of the oil and cooling of the water insures a high rate of exchange of heat from the water to the oil.—(*From the "Plumbers' Trade Journal*").

FUEL OIL
FOR HEAT and POWER

Devoted to developing and encouraging the efficient, scientific use of oil fuels.

Published Monthly

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Vol. 3 April. 1925 No. 10

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Vol. III. Published at 350 Madison Avenue, New York City No. 10

Refractories for Oil Burning Boilers

By Thomas S. Curtis*

FIREBRICK fail to give their normal or expected life in oil-fired boilers usually for a combination of reasons, two of which are recognized and appreciated. First, there is a tendency to soften or squat under loads, sometimes at temperatures hundreds of degrees below the actual melting point. This failure is brought about by an incipient vitrification of the brick body, that is, a tendency to become stony or glassy. When the glass forms, the body of the brick may partake of the properties of asphaltum; that is to say, it is rigid at low temperatures, but with increasing temperature it becomes plastic and deforms.

The second cause of failure is really an outgrowth of the first, namely, spalling, cracking and breaking off in pieces. In the observation of a considerable number of installations, the author has yet to see an actual case of failure due to spalling, without its predecessor, vitrification, having made its appearance. In other words, he seriously questions the value of the so-called "spall test," commonly used to demonstrate the suitability of a given brick from the standpoint of its resistance to spalling.

Let us now see how some of this destruction can be retarded.

Requirements Changed

The old question: "What temperature will your brick stand?" has gradually given way, under our persistent and well-meaning campaign of education and investigation to, "What will your brick stand at such and such a temperature?"

To illustrate: An excellent brick will bear a load of 25 lb. per sq. in at 3000 deg. Fahr. with not more than 10 per cent deformation, provided the atmosphere is neutral or oxidizing. The melting point of that brick would be 250 deg. higher at least, but the melting point is of small consequence. But if we permit the pores of that same brick to become saturated with reducing vapors at 3000 deg., it will not bear its own weight without squatting, let alone supporting a load as it must in a furnace wall.

---

*Presented before Los Angeles Section of The American Society of Mechanical Engineers, at Los Angeles, Cal.

*Director of Research, The Vitrefrax Company.

Now the value of a clay brick, in terms of load-bearing resistance, ability to maintain its porosity even at high temperatures under oxidizing conditions so that it shall not spall, and, in short in terms of general stability under high temperature, is measured in terms of the purity of the clay from which it is made, firstly, and secondly, in terms of the composition of that clay.

The ideal clay refractory would be dense kaolin; that is, one molecule of alumina to two of silica. But the two oxides must be combined as clay substance. There must not be more than 5 per cent of impurities, and of these not more than one-half of one per cent shall be free or uncombined.

The best clay brick that can be made, without regard for cost, is subject to drastic change in volume under intense reduction. Especially is this true as the alumina content increases, although with increase in alumina content the melting point is sharply raised.

Having learned that a good clay brick is well able to bear the weight at the temperatures employed in modern boilers if the atmosphere be oxidizing or neutral, and being unable to upset the practice which makes this atmosphere impossible of attainment in a boiler setting, we have done the next best thing; that is, prevent the reducing gases from entering the pores of the brick.

The value of glazes on brickwork has long been felt but scarcely understood. If a glaze be fluid, it will cut back and seriously erode the brick, causing as much damage as vitrification and spalling. If it be too refractory, the reducing gases will have started their work before the glaze seals the pores.

In an exhaustive effort to obtain a glaze that would be a happy medium, our research laboratory found what it wanted in sillimanite, which our

(*Continued on page* 96)

SOFTENING or squatting under loads and spalling, cracking and breaking off in pieces are the chief reasons for the failure of firebrick in oil burning furnaces. The ideal clay for firebrick would be dense kaolin; that is, one whose composition contains one molecule of alumina to two of silica with a very small trace of free impurities. The factors to be considered in the selection of proper firebrick are sufficient load bearing ability at the temperature used, to remain rigid; freedom of traces of impurities, to avoid gradual vitrification from within; proper glaze to seal the pores that will not deteriorate, and proper construction in the tieing up of the wall to the outer support.

Convention Program a Focus of Oil Burning Information

JUDGED by the completed program, the officials of the American Association of Oil Burner Manufacturers have spared themselves no effort in their preparations to give those who attend the Second Annual Convention and Exposition in Chicago, April 1, 2 and 3, three days of pertinent, useful speeches and discussion, interspersed with lighter entertainment. Every branch or phase of oil burning will be represented on the program by some authority in the industry, who will deliver his message to the meeting and then open informal discussions on it. The complete program is given on page 35.

J. W. Owens, Chairman of the Arrangements Committee

Demand for exhibit space in the exposition has been surprising, and the addition of several booths to care for late reservations has been necessary. Thirty-five firms will be represented in a total of 44 booths, three firms having double booths, another one having three and still another having four. From the character of the exhibits planned by each firm, the exposition will contain the widest assortment of oil burning apparatus that has ever been gathered under one roof. A diagram of the exhibit hall, with a list of the exhibitors, is given on page 56 of this issue.

Preparations to care for those in attendance and plans for the program of entertainment are being cared for by the Committee on Arrangements. These include a trip to the Underwriters Laboratories, an informal evening entertainment on the first day, and the annual banquet. A special stroke of good fortune was enjoyed by the Association in securing as principal speaker at the banquet Hon. Edward J. Catell of Philadelphia, Pa., who is widely known as an orator and entertainer of splendid ability.

The manager of the Edgewater Beach Hotel, where the convention is to be held, has been advised by the association to make reservations sufficient to care for all out-of-town visitors.

There is a possibility that the present program, which is given on page 35 of this issue of Fuel Oil, may be further lengthened by the addition of an address by Victor C. Alderson, president of the Colorado School of Mines, who is one of the foremost authorities in the United States on the extraction of oil from shale.

The committee on arrangements, to which goes much of the credit for planning the convention, consists of the following: J. W. Owens, Federal Gauge Company, chairman; J. L. McCormick, Hardinge Bros.; R. W. Barry, Drying Systems, Inc.; J. I. Janette, Jr., Janette Manufacturing Company; Jon Jaap, Cook Electric Company; Homer Linn, American Radiator Co., and Wallace Capen, Home Appliance Co.

High Speed Pumps Dangerous on Delivery Trucks

The use of high speed pumps, adopted by many of the oil companies to expedite delivery of oil from their oil trucks into storage tanks, has resulted in a number of explosions, some of which have been more or less disastrous, due principally to the following reasons:

1.—Vent lines of insufficient capacity.
2.—Vent lines incorrectly installed.
3.—Vents sealed—caused by dirt, foreign substances or congealed oil.

The use of the 1 in. vent on storage tanks as prescribed by the Fire Prevention Bureau is hardly ample to take care of the displaced air where oil is pumped with a high speed pump mounted on an oil truck with the driver often racing his engine.

The industry is aware that many individuals purchase their own storage tanks and attempt to make their own installations for the purpose of presumed economy. Generally, an incorrect vent installation is the result. A small vent may answer the purpose so long as the storage tank is filled by gravity, but when, subsequently, the tank is filled by high speed force feed methods, tremendous pressure develops within the tank causing the heads to bulge, and the tank to explode. The result, unfortunately, means property damage, oftentimes a conflagration, and potential danger to human life.

While tank manufacturers are in sympathy with the problems of the oil companies, their desire to serve the public quickly and efficiently, some of us advise against the use of high speed pumps on trucks as a general practice, or at least until a competent engineer has passed upon each and every installation. Even then the hazard is great, not only to the public but to our mutual interests.

R. T. Schurig,
Chicago Steel Tank Co.

Bemis Is Made Bank President

W. N. Bemis, president of the Home Appliance Company, St. Louis, Mo., has been elected president of the Liberty Central Trust Company of St. Louis. Mr. Bemis is also president of the Ozan-Graysonia Lumber Company and the Prescott and Northern Railroad Company.

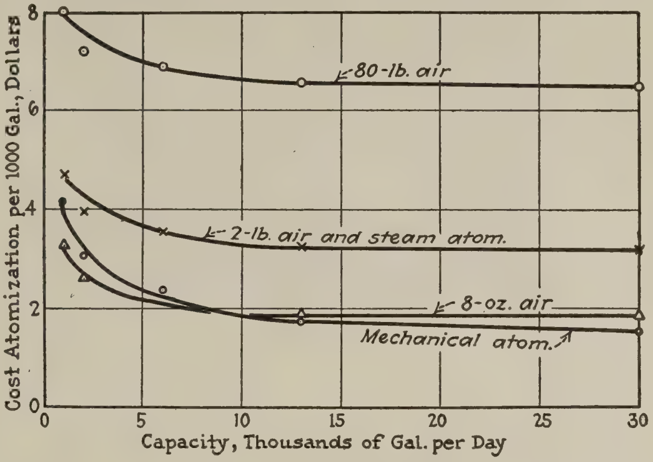

Fig. 1—Cost of Atomizing Fuel Oil

Comparing the Cost of Five Methods of Atomizing Fuel Oil

By Chapin Tyler

AN INTELLIGENT economic comparison of fuels presupposes a knowledge of the cost of preparing them for combustion. With ordinary coal furnaces, this cost comprises handling and stoking charges, plus the cost of ash removal. If powdered coal burners are used, there is equivalent charge for handling, crushing and pulverizing the fuel. With fuel oil, however, preparation cost is more complicated on account of the diversity of equipment and methods of atomization. In this calculation of the cost of atomizing fuel oil, the following conditions were assumed:

1. *Equipment Cost.* From a questionnaire sent to twenty-four manufacturers of fuel oil burner equipment, the following overall costs were calculated.

Hp.	Mechanical	Steam and Air Atomizing System
150.............	$5,000	$3,000
300.............	7,000	4,000
900.............	15,000	9,000
1,950.............	23,000	14,000
4,500.............	45,000	30,000

These figures include the cost of burners, strainers, duplex pumps, heaters, underground storage tank, all necessary piping, valves, fittings and meters, together with cost of in-

Table I—Cost of Atomizing Fuel Oil

	Mechanical Atomizing	Steam Atomizing	Air Atomizing 8-Oz. Pressure	Air Atomizing 2-Lb. Pressure	Air Atomizing 80-Lb. Pressure
150 *hp.* = 1,000 *gal. per day.*					
Air cost	....	....	$1.16	$2.53	$5.80
Steam cost or power cost	$0.48	$2.48	....	....	....
Fixed charges	3.67	2.20	2.20	2.20	2.20
Total	$4.15	$4.68	$3.36	$4.73	$8.00
300 *hp.* = 2,000 *gal per day.*					
Air cost	....	....	2.32	5.06	11.60
Steam cost or power cost	0.96	4.96	....	....	....
Fixed charges	5.13	2.93	2.93	2.93	2.93
Total	$6.09	$7.89	$5.25	$7.99	$14.53
Cost per 1,000 gal. oil	3.05	3.95	2.63	4.00	7.27
900 *hp.* = 6,000 *gal. per day.*					
Air cost	....	....	6.96	15.18	34.80
Steam cost or power cost	2.88	14.88	....	....	....
Fixed charges	11.10	6.60	6.60	6.60	6.60
Total	$13.98	$21.48	$13.56	$21.78	$41.40
Cost per 1,000 gal. oil	2.33	3.58	2.26	3.63	6.90
1,950 *hp.* = 13,000 *gal. per day.*					
Air cost	....	....	15.08	32.89	75.40
Steam cost or power cost	6.24	32.24	....	....	....
Fixed charges	16.87	10.26	10.26	10.26	10.26
Total	$23.11	$42.50	$25.34	$43.15	$85.66
Cost per 1,000 gal. oil	1.78	3.27	1.95	3.32	6.59
4,500 *hp.* = 30,000 *gal. per day.*					
Air cost	....	....	34.80	75.80	174.00
Steam cost or power cost	14.40	74.40	....	....	....
Fixed charges	33.00	22.00	22.00	22.00	22.00
Total	$47.40	$96.40	$56.80	$97.80	$196.00
Cost per 1,000 gal oil	1.58	3.21	1,89	3.26	6.53

stallation under average conditions.

2. *Fixed Charges and Maintenance.* A total of 22 per cent on the initial investment is charged, as follows:

	Per Cent
Interest on the investment	6
Depreciation, mean	10
Taxes and insurance	3
Maintenance and repairs	3
Total	22

3. *Cost of Steam.* If steam is used for atomization, 2.5 per cent of the total steam generated by the boiler is consumed. Steam for atomization is a charge against the gross boiler efficiency.

4. *Cost of Air.* This was calculated from a summary of performance for various types of blowers:

Machine Type	Fan	Displacement Turbine	Piston Compressor
Delivery pressure	8 oz.	2 lb.	80 lb.
Anticipated induction of atmospheric air, per cent	36	50	88
Cu. ft. of compressed air necessary to burn 1 gal. fuel oil per minute	960*	480	180
Energy necessary to compress above volume of air, kw.	3.55	7.6	17.4
Power cost-air for 1,000 gal, fuel oil at 2c. per kw.-hr.	$1.16	$2.53	$5.80

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*Required 1,500 cu. ft. free air per gallon of oil for complete combustion.

(*Continued on page* 92)

Webster
Oil Burner Coil
W

Announcing

A New Type Ignition *for* OIL BURNERS

THROUGH the use of a patented circuit, oil burner manufacturers are now offered, in the Webster Oil Burner Coil, a new and revolutionary type of ignition. The new coil offers a degree of dependable performance hereto unattainable. It produces a flaming spark sufficient for the direct ignition of fuels of very low specific gravity. Some of its features are: low current consumption, absolute safety, low temperature rise on continuous service, direct operation on supply line without transformer, low voltage across vibrator points assuring their long life, and freedom from the need of frequent servicing by the burner manufacturer.

On display for the first time at the National Association of Oil Burner Manufacturers Exhibit, April 1, 2, and 3, Edgewater Beach Hotel, Chicago, Space Number 29.

Webster Electric Company

Racine, Wisconsin, U.S.A.

No Recent Addition to Underwriters' List of Standard Burners

Contains Fifteen Domestic Burners and One Industrial— Additions Expected in April

SIXTEEN makes of oil burners appear on the latest list of Standard burners issued by the Underwriters' Laboratories, Chicago, complete to February 28, 1925. But one type of each burner is listed in all but two instances, the Kleen Heet and Lillibridge burners having three and four types approved respectively. Of the 16, only one is given under the head of "Industrial," the rest being classed as "Domestic." No additions have been made during the last three or four months.

The list, as issued by the Laboratories, with an explanatory heading, is as follows:

Oil Burner Listing Complete to February 28, 1925

Domestic

The oil burners listed by the following manufacturers as standard may be permitted for use when installed according to the requirements of the National Board of Fire Underwriters for the class, if not in violation of any State law or local ordinance *and if company insuring property consents to same in writing on its policy.*

Domestic oil burners, which may be used where a competent attendant is not constantly on the premises, are provided with automatic means for closing the oil supply to the burner in event flame is extinguished. These devices are provided with thermostatic temperature regulation unless otherwise specified in the individual card text.

"Arrow." Socony Burner Corporation, New York, N. Y.

Oil burner designed to burn kerosene or distillate of 35 to 45 deg. Baumé, for installation in hot water heaters, steam boilers and hot air furnaces. Standard—when fuel storage capacity conforms to local requirements, and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: "Arrow" on etched brass name plate attached to blower housing.

Baker "Model F." Baker Steam Motor Car and Mfg. Co., Inc., Pueblo, Colo.

Oil burner, designed to burn light distillate, gas oil, or kerosene having a specific gravity of 38 to 41 deg. Baumé and a flash point of not less than 105 deg. Fahr. or higher than 60 deg. Fahr., for installation in hot water heaters, steam boilers and hot air furnaces. Standard—when fuel storage capacity conforms to local requirements and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: "Model F" on name plate attached to blower housing.

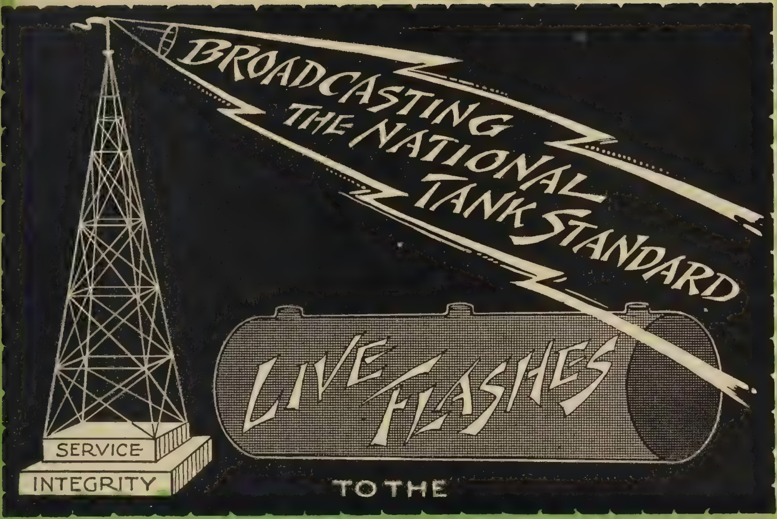
Berryman "Type A-L." Berryman System of Oil Heating, Inc., Cicero, Ill.

Mechanical draft oil burner with a. c. or d. c. electric motor drive. Temperature Control—Automatic. Ignition—Gas pilot. Fuel—Gas oil not heavier than 32 deg. Baumé. Fuel Feed—Suction from supply tank to standpipe and gravity from standpipe to combustion chamber. Designed for hot water, steam and hot air installations. Standard—when fuel storage capacity conforms to local requirements and installation is made in accordance with requirements of inspection department having jurisdiction.

Caloroil and Caloroil "Type A." Caloroil Burner Corp., New York, N. Y.

Oil burner designed to burn kerosene or distillate of 36 to 40 deg. Baumé, for installation in various types of hot water heaters, steam boilers and hot air fur-

(*Continued on page* 74)



OIL BURNER INDUSTRY

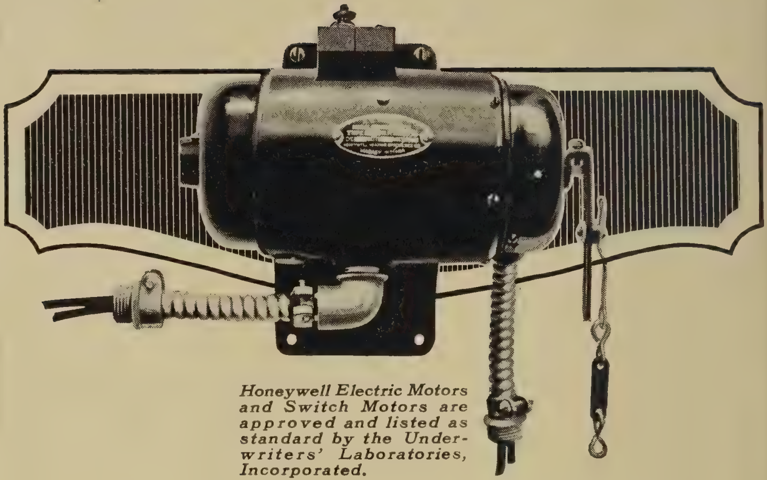
Let's Go, Full Steam Ahead!

SECOND ANNUAL MEETING, CHICAGO, APRIL 1-2-3

Welcome to Our Booths
Nos. 18 and 19

The Latest Developments in Our Line for
Your Industry Will Interest You

CHICAGO STEEL TANK CO.
1301-13 SO. 55TH COURT
CICERO, SUBURB OF CHICAGO. ILL. PHONES LAWNDALE 0041
CICERO 8070



Honeywell Electric Motors and Switch Motors are approved and listed as standard by the Underwriters' Laboratories, Incorporated.

It is a significant fact that leaders in the domestic oil burner field using Honeywell Controls include the oldest and most firmly established and the newest and most highly organized. In the one case, selection of controls is based on experience; in the other, it is the result of exhaustive experiments to find the best available device. In both cases the preference is for Honeywell.

The Honeywell Heating Specialties Co.
Wabash, Indiana

HONEYWELL
Temperature Regulators

Fuel Oil Markets

Warm Weather Lessens Domestic Demand—Heavier Oils Stronger

SPRINGLIKE weather over a major portion of the country in March and the approaching end of the active fuel oil season contributed to the weaker market and softer prices last month. Efforts of refiners to bring fuel oil prices more on a line with coal competition was also noted. Coal competition did not seriously affect burning oils.

Furnace oils or distillates which represented the smaller portion of the business held up better than the industrial fuels. A few plants in Group Three territory returned to burning coal, but the movement appeared to have been checked later in the month when prices were from 15 to 20 cents under former high quotations. With considerable agitation against fuel oil in the coal regions, sentiment for changing to coal was not as great as some expected.

Public utilities led the industrials in those plants pulling away from fuel oil to coal burning. Most of this business was of a spot character and of little significance. The largest public utility enterprises using oil buy on contracts, and the increased coal consumption was hardly reflected in the market.

Prices began to soften early in the month, and by March 20 the decline was from 15 to 20 cents on ordinary fuel. The regular 24-26 grade in Group Three was being sold by Oklahoma refineries at $1.10 to $1.15 on March 17. The lower market appears to have checked the threatened general coal movement. Domestic business was affected more for warmer weather reasons than any other.

Railroad contracts are still moving much material from the Mid-Continent and other production centers. Prices on this basis usually range around $1.35 a barrel. The large amount of contract material promises to keep the market on a steady keel until the end of the season.

Smackover Prices Down

Lower gravity fuels at Smackover, Ark., experienced a reaction during the month with lowering of crude prices in that area. Prevailing quotations ranged from $1.05 a barrel for lower grades to $1.25 for the higher gravities. Softer quotations for this class of fuel, heretofore on an equal basis with best Mid-Continent grades, is expected to create a better feeling in a quality product and at the same time bring prices down to a real trading basis.

South Texas fuel oils weakened in line with the market tendency at this time of the year. It is reported that there is not a large quantity of the product available. Quotations of $1.65 to $1.70 a barrel were being maintained on March 18.

Refiners are making an effort to clean up odds and ends in the fuel market preparatory to starting to store during the summer. There is the possibility that occasional prolonged cold weather will see a fair consumption of both industrial fuels and distillate for the balance of the season. Spot business may decline, as it has recently, which is but a natural trend of the market.

Prices, tank car lots, F.O.B. Group 3 refineries, on March 18, were quoted as follows:

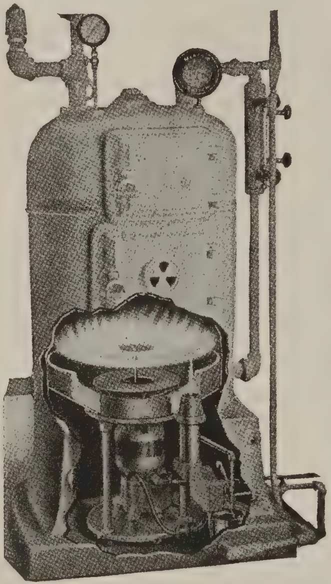
Fuel Oil 24-26.......	$1.10	$1.15
Fuel Oil 26-28.......	1.20	1.25
Gas Oil 32-36.......	.03⅜	.03½
Distillate 36-38.......	.03⅝	.03¾
Distillate 38-40.......	.03⅝	.03¾
Kerosene 41-43.......	.04½	.04⅝
Kerosene 42-44.......	.04¾	.04⅞

Record Gas and Fuel Oil Production in January

Production of gas and fuel oils in the United States during January of 1925 totalled 1,171,000,000 gallons, a daily average of 37,800,000 gallons. This represents a decrease in total from the previous month of 28,000,000 gallons, but an increase of 108,000,000 gallons over January of 1924. Domestic demand during the month reached the new record figure of 28,000,000 gallons, this being 65,000,000 gallons, or 5.9 per cent more than the December

Safe
Durable
Perfect Combustion

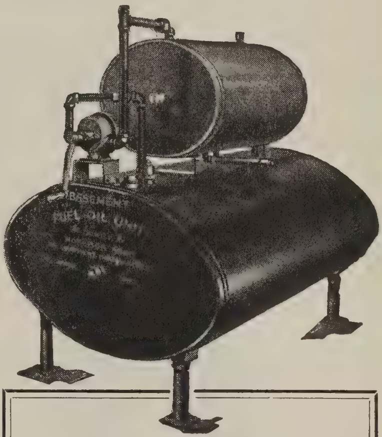
SUPER
Automatic
Oil Heater



Burns 28-32 Baume Gravity Fuel Oil for Home Heating. Good Profits for Live Agents.
Write for Details.

SUPER
Oil Heater Company
275 Connecticut Blvd.
Hartford Conn.

This Fuel Oil Tank Assembly Goes into Basement



Many conditions make it undesirable to install an outside fuel oil tank. In such cases, the Morrison Basement Fuel Oil Unit is recommended by fuel oil engineers.

Oval tanks are used so they may easily pass through any basement door. Though the supply tank holds 200 gal. and the auxiliary tank holds 50 gal., the unit occupies little floor space. Tanks made of No. 15 gauge black steel.

Comes complete with pump, connecting pipes, overflow pipe, measuring pipe, gauges and double-acting air vents.

List price on unit, complete	$120.00
Magnetic Gauge	$5.00
Pump	$16.00

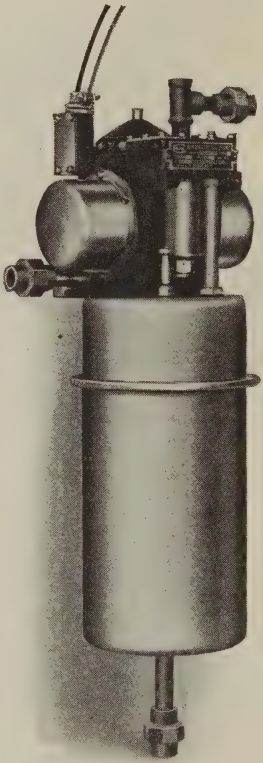
Write for Special Basement Fuel Oil Tank Folder

Send for literature covering complete fuel oil equipment line.

Morrison Bros.
"OIL EQUIPMENT HEADQUARTERS"
Dubuque, Iowa

COOK AUTOMATIC

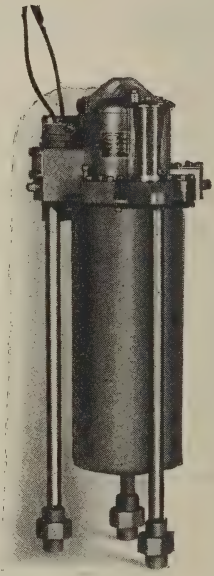
CONVENTION BOOTH NO. 1



Type F

Double Bellows

For burners requiring 30 gallons per hour or less of 28 gravity oil or lighter; maximum lift 12 feet.



Type D

Single Bellows

For burners requiring 10 gallons per hour or less of 28 gravity oil or lighter; maximum lift 10 feet.

BUILT ON TWO YEARS

OIL PUMPS

CONVENTION BOOTH NO. 1

Maintain a constant level of oil.

Cook Pumps are anti-syphoning.

Electric, fully automatic, no packing to leak.

Circuit is opened and closed by mercury switch.

Circuit wires insulated with special oil-proof insulation.

Series motor operates on D.C. or A.C. current.

Bearings operate under oil.

Safety device prevents oil from being pumped on floor in case of broken pipes.

No oil storage in basement.

Silent, efficient, economical to operate, and low in price.

Full Information Upon Request.

COOK ELECTRIC COMPANY

2700 Southport Ave. Chicago, Ill.

OF FIELD EXPERIENCE

total, and 136,000,000 gallons more than the demand in January of 1924.

Stocks on hand at refineries on January 31 amounted to 1,620,000,000 gallons, which was a decrease from the previous month of 50,000,000 gallons, and represented a 43 days' supply for the nation. The stocks at refineries on January 31, 1924, were 1,471,000,000 gallons.

Imports reached a grand total of 44,000,000 gallons during the month, which compares with a total of 46,000,000 during December and 36,000,000 gallons during January of 1924. Exports amounted to 97,000,000 gallons, which was 15,000,000 gallons lower than the December figure and 12,000,000 gallons lower than the total for January of 1924.

Indications are that production during February and March, although figures are not yet available, will show about the same daily average as January, with some probability of a slight rise. Demand however, has increased, if reports in the oil industry are correct, and stocks have also increased, according to the American Petroleum Institute statistics.

Johnson Appoints Distributor

S. T. Johnson Company, Oakland, Cal., has appointed the Automatic Oil Burner Corporation, New York City, its distributor for 24 counties in northern New York, all of Vermont, New Hampshire and the western part of Connecticut and Massachusetts, according to R. S. Beale, vice-president of the Automatic Oil Burner Corporation.

The Basel Valves and Heat Regulators

are now patented. Why? Because they are not just ordinary valves. They mean advanced theories in valves and valve control construction for Gravity and Mechanical burners.

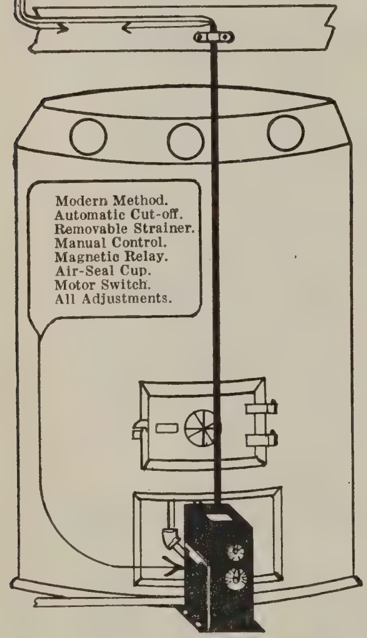
Manufactured in ten types.

Type A-2 listed as standard by Underwriters' Laboratories, in three phases, Manual control, Manual and Remote control, and Manual, Remote with Retarding element.

This cut shows our E-2 Heat Regulator, complete with thermostat. Valves and valve control is our hobby.

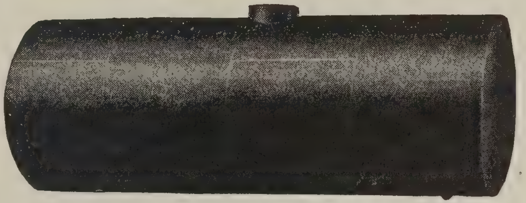
Literature on request.

Basel Manufacturing Co.
911 Mulberry St., Kansas City, Mo.



Modern Method.
Automatic Cut-off.
Removable Strainer.
Manual Control.
Magnetic Relay.
Air-Seal Cup.
Motor Switch.
All Adjustments.

THEY STAND ABUSE



Outlast Ordinary Steel Tanks

Butler tanks for oil burning equipment are made in galvanized or black, blue annealed copper bearing steel, 10, 12, 14 or 16 gage, and in sizes from 92 to 3155 gallons capacity. For use indoors and outdoors.

Special Sized Tanks Made to Order

Tanks, All Sizes—AIR TESTED

—Ready to Ship

If you burn oil, manufacture oil burners or sell oil burners—Write.

BUTLER MANUFACTURING COMPANY
KANSAS CITY **MINNEAPOLIS**

To Exhibit New Boiler at A.A.O.B.M. Exposition

According to an announcement by Homer Linn, engineer in the executive offices of the American Radiator Company, Chicago, his company has a new oil burning boiler which will be exhibited for the first time at the second annual convention and exposition of the American Association of Oil Burner Manufacturers, to be held at the Edgewater Beach Hotel, Chicago, April 1, 2 and 3.

Gives Diesel Advantages

An attractive booklet has been printed by the De La Vergne Machine Company, New York City, featuring De La Vergne Diesel oil engines. Advantages of the Diesel engine over other power plant equipment, and some features of the De La Vergne engines in particular are given.

Quinn Given Pacific Coast Territory

W. R. Quinn, former manager of the fuel oil department of the Combustion Engineering Company, New York City, has been appointed Pacific Coast Agent, with headquarters in San Francisco. His territory will include the States of Washington, Oregon and California. The Combustion Engineering Corporation manufactures Quinn oil burning equipment and other combustion equipment.

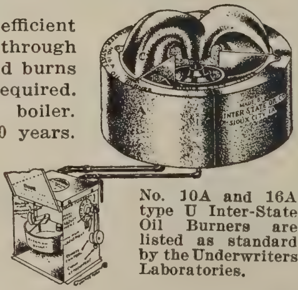
INTER-STATE
OIL BURNERS
Are Reliable and Economical

Simply designed, ruggedly built, efficient heating. Air is pre-heated as it passes through the arches. Oil thoroughly vaporizes and burns a clear, hot flame. Minimum oil required. Easily installed in stove, furnace or boiler. Practically no servicing. Guaranteed 10 years.

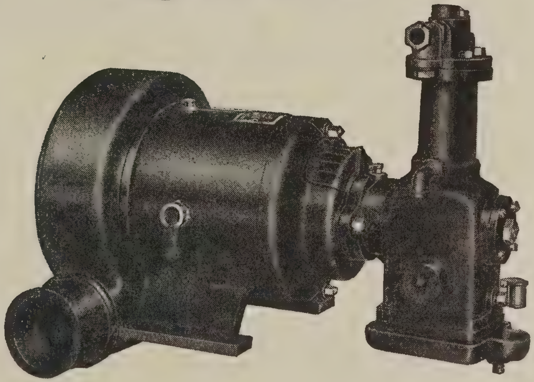
DEALERS—If you are a reputable dealer and will mail us this ad we will make you an unusual proposition. Write for particulars —TODAY.

Inter-State Oil Company
1405 Grand Ave., Sioux City, Iowa

No. 10A and 16A type U Inter-State Oil Burners are listed as standard by the Underwriters Laboratories.


MADE BY INTER STATE OIL CO SIOUX CITY IA

See it Operate



Motor, Blower, with air inlet regulator, integral with fuel oil pump.

BOOTH No. 35
A. A. O. B. M. CONVENTION

We have a story that we are very anxious to tell you. See our booth for new oil burner equipment.

Janette Manufacturing Company
556-558 West Monroe Street
Chicago

PHILADELPHIA
439 REAL ESTATE
TRUST BUILDING

NEW YORK
SINGER BUILDING
149 BROADWAY

Patent Office Control Is Changed

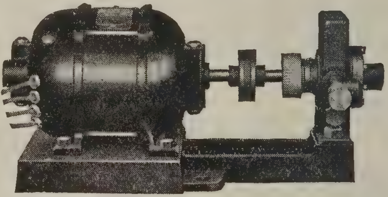
An executive order transferring the United States Patent Office from the jurisdiction of the Department of the Interior to the jurisdiction of the Department of Commerce, thereby placing it under the control of Secretary Hoover, was issued by President Coolidge on March 19.

In announcing the change, Secretary Hoover declared that he intended to undertake a vigorous campaign for the removal of present injustices toward American patentees and American manufacturers.

"At the present time," said Mr. Hoover, "an American patentee is required in many foreign countries to continuously manufacture in that country under his patent or lose his patent rights. We make no such requirement in the United States. The consequence is that our inventors and manufacturers, in order to protect their inventions, have been driven to the establishment of a large number of factories abroad, whereas foreign patentees have been able to use their patents in the United States to actually prevent manufacture here.

"A list of many large manufacturers established by American capital abroad in order to protect their patents could be enumerated, whereas there has been no establishment of manufacturers in this country for this reason. In fact, a foreign patentee, by registering his patent in the United States, can hold it for seventeen years and prevent manufacture of the article in the United States."

This is the "PAUL" Type "RRO" Revolving Reciprocating Pump For Oil Service



A new type of pump especially designed to handle fuel oil of any gravity in common use, and to meet the peculiar conditions characteristic of a special service in the proper and most efficient way.

Double acting piston of positive displacement.

The Paul type "RRO" oil pump is capable of working against a high suction lift, can be run at high speed, is quiet, self priming, and requires no service.

See this pump on display at the Convention of the American Association of Oil Burners Manufacturers.

FORT WAYNE ENGINEERING & MANUFACTURING CO., INC.
Main Office and Factory, Ft. Wayne, Indiana

The Dealer's
Logical Forward Step

The Sword Burner

It Sells Itself. Its complete silence fascinates the customer. The low cost of operation appeals to him. He sees at once why "gun and target atomizing" stops trouble and how "combustion gas vaporizing" saves fuel.

It Satisfies. Simplicity and a positive, fool-proof oil feed banish "service" and satisfy both dealer and owner from the very start.

It Sells Others. Every owner is at once a booster. He recommends the Sword on every count: convenience, simplicity, lower fuel cost and a home heated evenly in all weathers. The Sword is the burner that will build your sales.

Dealer Information on Request

Sword & Kimber Company
4861 Stenton Avenue
Philadelphia Penna.

The
SWORD
BURNER

A New and Powerful Factor in the Oil Burner Industry

The Silent Automatic Burner Corporation announces its new Silent Automatic Burner.

Responsible and competent judges predict that it will profoundly affect the entire trend of oil burner developments.

It introduces and establishes entirely new standards of heating efficiency, economy and operating simplicity.

In addition to its operating and mechanical superiorities it possesses price advantages that give it a tremendous consumer preference.

The Silent Automatic Burner will be marketed on an aggressive basis—to take full advantage of all its opportunities.

This naturally creates opportunities for men—as shown by the next page.

Distributors Invited to Interview These Men

Mr. Walter F. Tant, President; Henry D. Mackaye, Sales Manager and Mr. G. Stanley Meikle, Chief Engineer, of the Silent Automatic Burner Corporation, will, during the meeting of the American Association of Oil Burner Manufacturers, be at the

Edgewater Beach Hotel

April 1, 2 and 3

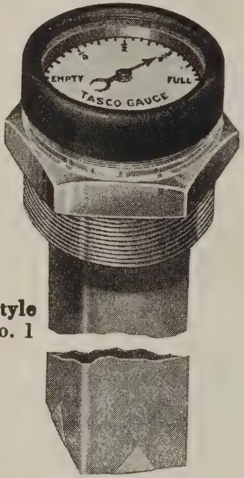
Responsible men are cordially invited to call on us to get the facts at first hand.

WALTER F. TANT, *President*
HENRY D. MACKAYE, *Sales Manager*
G. STANLEY MEIKLE, *Chief Engineer*

SILENT AUTOMATIC BURNER CORPORATION
DETROIT, MICHIGAN

"Tasco" Gauges

are standard equipment on more than 50% of all Fuel Oil and Oil Burning devices on which gauges are used.



Style No. 1

There are types for installation in ends, tops or sides of tanks—either with our standard flanges or with 1½ or 2 inch I P threads.

Send for complete information on different styles

The Akron-Selle Co.

"40 *Years in Business*"

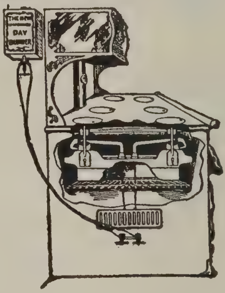
Akron, Ohio

Special Course in Heating and Ventilating

A special course in heating and ventilating was instituted in New York University beginning early in February, conducted by F. C. Houghten, secretary of the American Society of Heating and Ventilating Engineers. Every possible topic under the general head of practical heating and ventilating will be covered during the course.

Winslow Dealers Meet

Kleen Heet burner dealers from all over the country attended the convention held for representatives and dealers of the Winslow Boiler and Engineering Company, which was held in Chicago late in February.



Why Overlook This Opportunity?

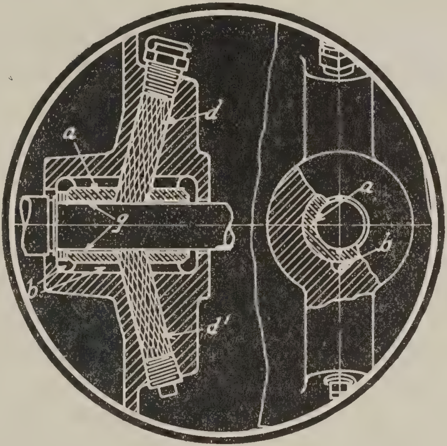
Every Cook Stove and Range a prospect. Think of the volume.

Sold with Absolute Guarantee.

Dealers and Distributors wanted.

Day Oil Burner Co., Inc.
904 West Lake Street
Minneapolis Minnesota

5,000 Hours on One Oiling



Such a record of *continuous* motor service is possible only if every *drop of oil in the bearing is fully utilized.*

The diagram above shows how this is accomplished by the Ohio Sleeve Type Bearing:

1. Grooves (g) top and bottom allow the oil to flow from end to end of bearing.
2. Grooves (b) collect all excess oil and conduct it to the lower oil well (d^1). *Not a drop of oil escapes from the bearing.*
3. Two oil wicks (d and d^1) lubricate the shaft above and below.

Ohio Motors equipped with this improved type of Sleeve Bearing run very quietly and practically eliminate the usual sleeve bearing troubles due to the lack of regular oiling.

A test motor if you want it.

THE OHIO ELECTRIC AND CONTROLLER COMPANY
5920 Maurice Avenue Cleveland, Ohio

OHIO MOTORS

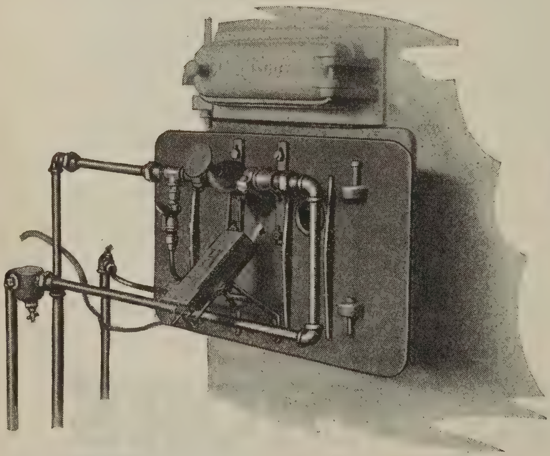
A Burning Opportunity!

Picture this Burner so installed on the rear of your car that you can drive to a man's door and in 2 minutes demonstrate the most efficient Burner made.

Are you Big enough to handle one State???
Are you financially responsible?

If so, write us about—

The lowest priced high-class proven burner.
A principle as old as successful oil burning.
Burns any grade of domestic fuel oils.
Can be instantly changed from oil to coal fire.
Built outside of your furnace—automatic, simple and safe.



HUBBARD OIL BURNER

724 2nd
Ave., So.
Minneapolis
Minn.

FUEL OIL
FOR HEAT and POWER

Devoted to the efficient burning of oil

April Special Selling Supplement, 1925

Program

Second Annual Meeting, American Association of Oil Burner Manufacturers

Edgewater Beach Hotel, Chicago, April 1, 2 and 3, 1925

WEDNESDAY, APRIL 1.

Registration.
Invitation trip to Underwriters' Laboratories.

10 A.M.

Meeting of Board of Directors—Board Room, 1st Floor.
Appointment of Nominating Committee.

GENERAL SESSION, 2 P.M.

President's Address: "The Old Year and the New."
Edward P. Bailey, National Airoil Burner Co., Philadelphia, Penna.
"Standards of Ethics and Practice for Oil Burner Industry."
C. H. Chalmers, Chalmers Oil Burner Co., Minneapolis, Minn.
"Oil Burning in Canada."
Lionel L. Jacobs, Fess Oil Burners of Canada, Toronto, Ontario.
Report of Committee on Underwriters' Standards.
J. H. Hirsch, Chairman.
Report of Committee on Simplification and Nomenclature.
G. H. Rittenhouse, Acting Chairman.

EVENING.

Entertainment—Chicago members and friends of the industry will act as hosts at an informal entertainment and buffet lunch in the ballroom, ground floor. Ladies invited.

(*Continued on page* 36)

Program

(*Continued*)

THURSDAY, APRIL 2, 10 A.M.

"Some Reflections on Basic Engineering Experience in Oil Burning."
Ernest H. Peabody, Peabody Engineering Corp., New York.
"Making Fuel Oil Deliveries a Science."
C. E. Doud, Lynch-Clarisey Company, Chicago, Ill.
"Analysis of Oil Flames."
James L. Breese, Jr., Breese Engineering Corp., Chicago, Ill.
"Uses of Portable Oil Burning Equipment."
Geo. P. Kittle, Aeroil Burner Co., Union Hill, N. J.

AFTERNOON, 2 P.M.

"Training Dealers and Installation Engineers."
W. W. Williams, Williams Oil O Matic Heating Corp., Bloomington, Ill.
"Installation Standards."
E. J. Smith, Underwriters' Laboratories, Chicago, Ill.
"The Answer to the Coal Man's Propaganda."
Geo. W. Lee, Foamite-Childs Corp., Utica, N. Y.

4:30 P.M.

Board Room, First Floor.

Election of Officers.

EVENING, 7:00 P.M.

Annual Banquet. Hon. Edward J. Catell, Philadelphia, Pa., Speaker. Dancing following the banquet.

FRIDAY, APRIL 3, 10 A.M.

"What About the Dealer?"
L. P. Ordway, Winslow Boiler and Engineering Co., Chicago, Ill.
"The Year's Progress with Temperature and Heat Controls."
W. L. Huff, Honeywell Heating Specialties Co., Wabash, Indiana
"Putting the Sale in Salesmen."
E. George Monk, Automatic Burner Corp., Chicago, Ill.
"Heating Problems and Oil Burning."
Homer Linn, American Radiator Co., Chicago, Ill.

AFTERNOON, 2 P.M.

"Facts about Galvanized Tanks and their Installation."
Edgar A. Bienenstok, Milwaukee Tank Works, Milwaukee, Wis.
"Facts about Black Tanks and their Installation."
A. A. Butter, Graver Corp., Chicago, Ill.
"Proper Venting of Oil Tanks."
R. J. Anschicks, Protectoseal Co., Chicago, Ill.

RADIO ADDRESS

During the Convention Wallace C. Capen, vice-president of the Home Appliance Corporation, St. Louis, Mo., and former president of the Association, will deliver a radio address covering the entire field of oil burning, from the Edgewater Beach Hotel broadcasting station WEBH. Time to be announced.

See Us
at the Convention

Jefferson Ignition Equipment has played an important role in gaining public acceptance of Oil Burner systems. For Jefferson has set the standard from the very outset.

New improvements are embodied this year — developments which will be of vast interest and importance to you. Be sure to see us at the exhibit.

Our plant will be open for your inspection.

Consult us on your ignition problems.

Jefferson Electric Mfg. Co.

505 So. Green St., Chicago

MANUFACTURERS OF:
- *Gas Furnace and Oil Burner Transformers and Ignition Equipment*
- *Bell Ringing Transformers*
- *Sign Lighting Transformers*
- *Heavy Duty Signal Transformers*
- *Auto Transformers*
- *High Voltage Transformers*
- *Welding Transformers*
- *Automobile Ignition Coils*
- *Jump Spark and Make and Break Coils*
- *Testing Instruments*
- *Toy Transformers*
- *Radio Transformers*

Jefferson Ignition

Electric Ignition

The Essential Feature

For Those Who Buy
For Those Who Sell

Electric ignition is the one essential feature of an oil burner to make it 100% automatic, safe, economical, and ever ready to respond to changes in the weather.

It is the answer to the buyer's question: "Why should I bother with gas pilot lights and other remnants of the days of antiquity of oil burners?"

That is why the Electrol with its automatic electric ignition has been the first choice of so many satisfied thousands of users.

Electric ignition is the one essential feature of an oil burner to make it 100% attractive to dealers.

It is the answer to the dealer's question: "Why should I sell something which is hard to put over?"

That is why the Electrol Automatic Oil Burner franchise has been so actively sought by live dealers.

Electric ignition is the salient but not the only point of superiority in the Electrol. It has other features which, combined with its automatic electric ignition, make the Electrol Burner the leader in its field—the choice of those who buy and the preference of those who sell.

How about you? Are you selling the most improved type of oil burner?

If you are not, come and talk to us at the convention and let us show you how really good an oil burner can be.

We have a worth-while proposition to make to dealers interested in obtaining our franchise in the limited territory which is still available. Look for us in Booth 6 and 7 during the convention of The American Association of Oil Burner Manufacturers, Edgewater Beach Hotel, Chicago, April 1, 2, 3.

HOME APPLIANCE CORPORATION
2818 Locust Blvd. St. Louis, Mo.

(Scott-Newcomb System)

ELECTROL

Electric Ignition Quiet Operation

AUTOMATIC OIL BURNER

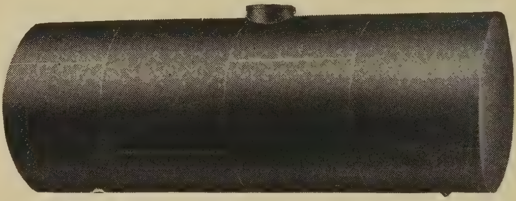
Listed as standard by Underwriters' Laboratories

Butler-Built

Means

Durability—Tightness

These are the two most essential qualities of fuel oil tanks, qualities which are as much a part of Butler Tanks as the B is a part of Butler. Durability is not *talked* into tanks, it's *built* into them and we have the right specifications for the job—our results will prove it to you.



Butler Horizontal welded tanks are made in eight different sizes, from 555 to 3155 gallons capacity, of 10, 12 and 14 gage blue annealed copper bearing steel. Furnished with the manhole and necessary tappings. Vertical tanks in all sizes.

If you are in any way interested in oil, you can get no clearer, more concise information and advice than is contained in our booklet "Fuel Oil Tanks for Oil Burning Equipment." Fill in the coupon and send it in today.

Butler Manufacturing Co.

Kansas City **Minneapolis**

BUTLER MANUFACTURING CO.
Kansas City, Mo.
I am interested in a .... tank, size .... gals. Please send me complete information.

Please quote on following size ....

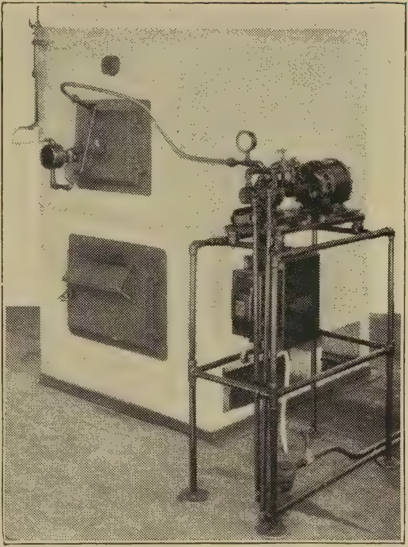
Name ....

Firm ....

Address ....

City ....State ....F. O.

What about your oil burner profits?



Simple Design

Noiseless

Accessible

When everything is said and done—what about your profits from burner sales? If they are not as large as they should be, why aren't they?

We believe we have a solution. It is the Pascoe Burner.

Dealers and users find the Pascoe Burner profitable because it is designed and built on two basically sound oil burning principles. The first is proper atomization; the second, proper application of the flame.

Hundreds of successful installations prove the soundness of the Pascoe method of securing complete atomization and scientific flame application. If in Chicago during meeting of the American Association of Oil Burner Manufacturers, plan to visit our show room and see a demonstration of the Pascoe.

Write for details about the Pascoe Burner and available territory open to dealers.

The William H. Pascoe Co., Inc.

2301 Ward St. **Chicago, Ill.**

An effective display of the complete Honeywell line at the Chicago Convention, spaces 24-26-28-30.

After thorough experience with Honeywell Controls, leaders in the domestic oil burner field continue to specify Honeywell equipment. It is particularly gratifying to know that this action is prompted solely by an insistence on that quality which Honeywell alone delivers.

The Honeywell Heating Specialties Co.
Wabash, Indiana

HONEYWELL
Temperature Regulators

Listed as Standard by the Underwriters' Laboratories

An effective display of the complete Honeywell line at the Chicago Convention, spaces 24-26-28-30.

Honeywell Electric Motors and Switch Motors are approved and listed as standard by the Underwriters' Laboratories, Incorporated. They consume only the minimum of electric current and are remarkable for their simplicity, dependability and freedom from service needs.

The Honeywell Heating Specialties Co.
Wabash, Indiana

HONEYWELL
Temperature Regulators

Listed as Standard by the Underwriters' Laboratories

The Leading Carburetor Engineer
Has Perfected the Super-System of Heating—

RAYFIELD

PATENTS PENDING

AUTOMATIC FUEL OIL BURNER

Rayfield Features

Double Length Flame Travel
No Baffling Walls
No Carbonizing
Burns 24° to 30° Fuel Oil
Any Heater or Boiler
Special Safety Devices
Quiet, Smokeless, Odorless
Guaranteed One Year

This engineer is Chas. L. Rayfield, inventor of the world-famous Rayfield Carburetor for autos.

His lifetime of practical experience has made him an unquestioned authority on carburetion and the combustion of liquid fuels.

In this, his latest invention, he employs entirely new principles with a double method of atomization which completely solves the problem of perfect oil combustion.

3 Years of Successful Performance

In homes, business blocks, theatres and factories, large and small, the Rayfield has demonstrated its remarkable heating ability, its economy and its freedom from trouble.

It applies the heat directly to the lower area of the fire box, exactly as intended by the heating plant manufacturers. In this and other respects, the Rayfield is entirely different from any other oil burner.

Our Responsibility

The importance of dealing with a responsible concern is fully appreciated by every one.

The Rayfield Mfg. Co. was organized by responsible and successful business men for the sole purpose of manufacturing and marketing the Rayfield Oil Burner.

We invite the strictest investigation of the company and its personnel.

Dealers, Users: Visit Our Factory

Interested parties are invited to visit our factory and meet Mr. Rayfield who will demonstrate the burner and answer all questions.

Write for descriptive circular.

RAYFIELD MFG. CO.

535 E. 75th St. CHICAGO Phone: Vincennes 4162

Buy Your Graver Welded Tanks by Car Loads

because—

1—Car load freight is less than one-half the rate on single tanks.

2—You only need to have 14,000 lbs. to get the car load rate. This requires but from 10 to 14 tanks.

3—Quicker delivery. Car loads are delivered much sooner than local freight.

4—Prices which are low on single tanks are still lower on car load lots.

Every Graver Welded Tank is built of "Class A Structural Quality Steel," with lap joints and inverted flanged heads making it stronger than required for the Underwriters' Label, which it carries.

To convince yourself send us the sizes you require—from 550 to 5,000 gallons—and let us quote on a car load.

GRAVER *Corporation*

(WM. GRAVER TANK WORKS—FOUNDED 1857)

Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment

---

160 Todd Avenue, East Chicago, Ind.

New York **Chicago** **Tulsa** **Houston**

FIFTEEN YEARS
of
ROTARY OIL BURNERS

◆

Prospective dealers will be interested in the unsurpassed record of the Rotary for Quietness, Economy and Efficiency.

◆

The Rotary is a medium priced burner of the forced draft type, manufactured by a forty year old company with an established reputation for service and satisfaction.

◆

Some excellent territory still available.
Write today.

PENNSYLVANIA GLOBE ROTARY OIL
BURNER CO.
1934 Market St.—Philadelphia

Destination of this shipment and name of dealer supplied upon request.

The picture speaks for itself

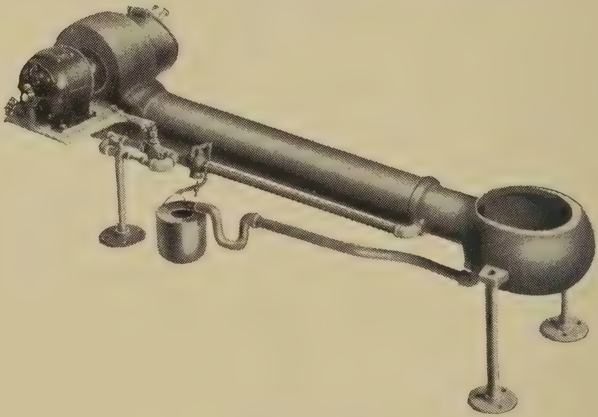
Get the facts about the one
proven oil burning furnace

Write

The Meyer Furnace Company
Peoria, Ill.

SUPREME OIL BURNER

DEPENDABLE, EFFICIENT, SIMPLE AND SAFE
Materials and Workmanship THE BEST



Specifications

DESIGN— Backed by three years in the manufacture of burners. The "Whirlpool" combustion chamber produces high burning efficiency with minimum noise.
MOTOR— Westinghouse, new special enclosed type of 1/20 h.p. Extra large bearings, top oilers.
CONTROLS—Minneapolis Heat Regulator controls for Automatic type burner.
CAPACITY— 1100 ft. Hot water and 800 ft. Steam radiation.
FUEL— Gas oil and distillates from 32 B. gravity up.

DEALERS' PRICES

$75.00 **Manual Control Type**

$125.00 **Automatic Type**

Attention, Dealers!

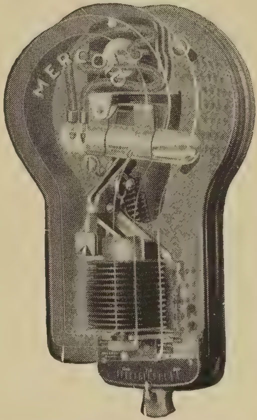
This is YOUR opportunity. A burner that is RIGHT, is easy to install, cuts service calls, backed by an aggressive organization. A large volume of sales and a real profit are assured you. *Send for sample burner to-day,* and arrange for *your* territory.

Supreme Mfg. & Machine Co.
6 East 27th St. **Minneapolis, Minn.**

The Federal Mercoid
System of

Direct Control

meets the most exacting requirements of the Oil Burner Industry.



MERCOID THERMOSTAT

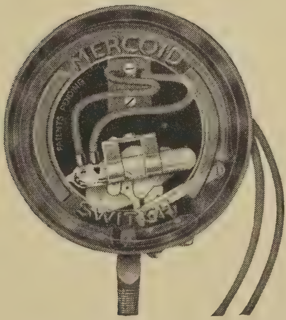
Mercoids are listed as standard by Underwriters Laboratories, Inc.

Write for Bulletin E 1

The
Federal Gauge
Company

564 West Adams Street
Chicago, Illinois

New York Office: 25 Church Street



MERCOID BOILER CONTROL

Listed as Standard by the Underwriters' Laboratories

The truth about

EIGHTEEN years ago people nodded their heads and said, "Yes, automobiles are here to stay." Today everyone knows that is true of oil burners. But many of the pioneer automobile manufacturers are not listed in "Who's Who." Isn't there a moral in this for the man looking for an oil burner agency? The question he must ask and answer is, "What is it that insures the permanency of an organization?"

This question has only one answer—the product.

It is perhaps natural for one to be swayed by nationally advertised burners. But let this stern fact temper their judgment: No amount of advertising, no amount of selling effort, will long profitably sell a burner that is not fundamentally right, that doesn't give the greatest efficiency possible to be obtained from an oil burner.

How can an oil burner be judged? There are four cardinal principles of oil burning:

1—The proper mixture of oil and air.

2—Thorough atomization of oil.

3—Oil must be burned in suspension.

4—An oil burner, to be thoroughly efficient, must retain the natural functions of a coal heating boiler.

Some burners check up well on Number One. A few score for Number Two. But mighty few, if any, other than ABC, score 100 per cent on Number Three and Number Four.

In fact, ABC is the only oil

oil burners —

burner that retains the natural functions of a coal heating boiler. This point is entirely ignored by other burners.

Four years ago a noted engineer said, "ABC is the only burner that has the right principle." Today that same thing can be said. That's why ABC is so well received by architects and heating engineers. Many have installed it in their own homes.

We never have splurged, preferring to build a firm foundation. We felt that after we had developed a superior burner, then would be time enough to consider national distribution. This problem has been solved. A dealer can now take the ABC agency knowing that his profit will not be eaten up in service.

◆

Progressive Dealers Wanted

We want to hear from men who see the possibilities of the burner industry and want to associate with the recognized leading oil burner.

Automatic Burner Corporation

312 North May Street
Chicago, Illinois

ABC OIL BURNER

no noise — no carbon

Announcing

The Reflex Oil Burning System

A New Engineering Principle

The REFLEX oil burning system employs several new engineering principles in design and construction and operation. Atomization is by high powered high speed turbine and turbine is operated by a low pressure blower, electrically driven.

REFLEX burners are the result of many years' work, giving unusual advantages over all types of oil burners on the present market. REFLEX burners atomize perfectly the heaviest of Mexican oils.

Incorporated in the design of REFLEX burners is a high speed turbine operating the atomizing cup at a speed of 16,500 r.p.m., an electrical preheating apparatus, also an automatic device for stopping the flow of oil in atomizing cup when burner is out of operation.

We guarantee a saving of 10% to 20% in fuel and efficiency over any oil burner on the present market. This has been proven by tests conducted by the Massachusetts Institute of Technology of Boston. Write us for details of these tests.

REFLEX burners are made in four sizes. REFLEX blowers and pump outfits are made in three sizes. Multiple application of burners will efficiently take care of any heating unit. REFLEX burners are particularly adapted for the heating of large buildings and for industrial purposes.

Desirable dealers franchises are open for reliable firms.

SIMPLEX OIL HEATING COMPANY

87 BROADWAY PROVIDENCE, R. I.

How Far Have We Gone?

THE Editor of **Fuel Oil** has courteously invited me to send a greeting to the members of the American Association of Oil Burner Manufacturers, and I gladly accept the opportunity.

You are wondering how far we have gone during the year along the road that we saw before us eighteen months ago when our Association was organized. Our progress has been so marked that it would take more than a greeting to give the answer, but this much we can confidently state:

Our Association has made possible cooperation within the Industry which has become very manifest and very helpful.

It has placed our Industry in its proper light before other lines of activity with which our work should be correlated.

It has placed us in a position of responsibility, and we have been called upon during the past year more times than we can tell to render service that has been of inestimable benefit to the entire Oil Burning Industry.

We have cooperated with the petroleum industry in working out their plans for the use of oil as fuel.

We have actively assisted the National Fire Prevention Association in drafting proper regulations for the use of oil burning equipment.

In fact, the calls that have been made upon us have been indicative of complete recognition throughout the land.

How far have we gone? We have taken our first steps. We have gone just far enough to see the opening vista of future usefulness for the benefit of our members, our associated industries and our customers.

The increase in our activities cannot fail to be very marked from the moment of our coming Convention, and suggested plans to be presented by our Executive Secretary will aim to lead us along the way.

EDWARD P. BAILEY,
President
American Association
of Oil Burner Manufacturers.

Another Problem Solved!

Automatic Recycling When Current Fails

The MINNEAPOLIS HEAT REGULATOR

Listed as Standard by the Underwriters' Laboratories

Minneapolis—
Motor Program
. . . Switch

See It Demonstrated at the A. A. O. B. M.
Convention

This new and unique control unit developed by Minneapolis engineers is recommended for oil burners which require a definitely timed and set program of operations in the starting and stopping of the burner.

One outstanding feature is the automatic recycling of burner in the event of interruption in power circuit. Switch returns to starting position and performs the complete ignition cycle.

Control switches can be made to cut in and out according to any program desired.

Varying gear ratios can be furnished, affording a range in operating periods from 30 seconds to six minutes to meet particular requirements.

Don't fail to see this remarkable control unit at the Convention.

MINNEAPOLIS HEAT REGULATOR CO.

Established 1885

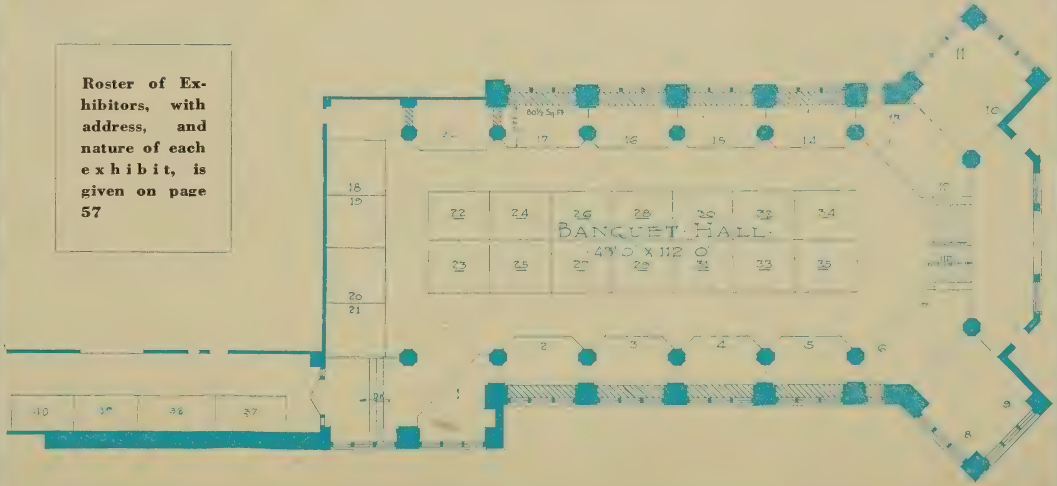
2920 Fourth Ave. So. Minneapolis, Minn.

Descriptive Bulletin
Now Ready—*Write for It!*

Listed as Standard by the Underwriters' Laboratories

Exhibit Hall Plan

American Association of Oil Burner Manufacturers



Roster of Exhibitors, with address, and nature of each exhibit, is given on page 57

Second Annual Meeting and Exposition

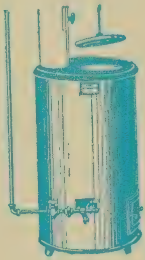
Edgewater Beach Hotel
Chicago, April 1, 2, 3.

Roster of Exhibitors

Booth	Exhibitor and Exhibit
1	**Cook Electric Company, Chicago.** Electrical Oil Burner Equipment.
2	**FUEL OIL for Heat and Power, New York.** Magazines and Books.
3	**W. B. Wilde Company, Peoria, Ill.** Oil Burners.
4	**Leader Iron Works, Decatur, Ill.** Oil Storage Tanks.
5	**Basel Manufacturing Company, Kansas.** Safety Valves, Regulators and Controls.
6-7	**Home Appliance Corporation, St. Louis, Missouri.** Oil Burners and Oil Burning Boilers.
8	**Kruse Company, Indianapolis, Ind.** Heaters.
9	**The Tiffany Company, Newark, N. J.** Oil Burners.
10-11	**Blackmer Rotary Pump Company, Petoskey, Mich.** Pumps.
12-13	**S. T. Johnson Company, Oakland, Cal.** Oil Burners.
14	**Plibrico Jointless Firebrick Company, Chicago.** Refractory Materials and Fire Clay.
15	**Copeland Products, Inc., Flint, Mich.** Automatic Refrigerator.
16	**Oil Products Appliance Company, Maywood, Ill.** Oil Storage Systems.
17	**American Blower Company, Detroit, Mich.** Blowers.
18-19	**Chicago Steel Tank Company, Cicero, Ill.** Oil Storage Tanks.
20	**Ft. Wayne Engineering & Manufacturing Company, Fort Wayne, Ind.** Oil Pumps.

(Continued on page 58)

Clean Up on This "Clean-Up" Campaign!



Wherever you sold an oil burner you started a clean-up campaign. Now why not go a step further? Show oil burner users how to eliminate the unsightly rubbish barrel and filthy garbage can by selling them the Home Gas Incinerator.

Dries out the garbage, then burns it completely. Reduces 2¾ bushels of garbage and rubbish to a pint of ashes. Elbow height. Simple, economical to operate. Many exclusive features. *Positively needs no servicing.* Push the Home Incinerator for big profits this spring.

Home Incinerator Co.
209 Grand Ave.
Milwaukee, Wis.

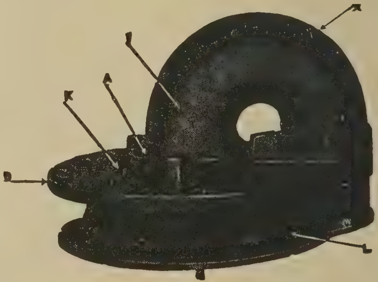
Write today for prices and specifications

The Home IncineratoR

Roster of Exhibitors *(Continued)*

Booth	Exhibitor and Exhibit
21	The Federal Gauge Company, Chicago. Temperature and Safety Controls.
22	Milwaukee Tank Works, Milwaukee, Wis. Oil Storage Tanks.
23-25-27	Minneapolis Heat Regulator Company, Minneapolis, Minn. Heat Regulators and Controls.
24-26-28-30	Honeywell Heating Specialties Company, Wabash, Ind. Heat Regulators and Controls.
29	Webster Electric Company, Racine, Wis. Electrical Supplies.
30	Jefferson Electric Company, Chicago. Ignition Equipment, Transformers and Testing Instruments.
32	Aetna Automobile Oil Burner Company, Providence, R. I. Oil Burner.
33	American Radiator Company, Buffalo, N. Y. Oil Burning Boiler.
34	The Reliance Gauge Column Company, Cleveland, O. Boiler Safety Gauge and Control.
35	Janette Manufacturing Company, Chicago. Motors and Blowers.
36	Newport Boiler Company, Chicago. Oil Burning Boilers.
37	Leiman Brothers, New York City. Pump Units.
38	Absolute Contractor Corporation, Beloit, Wis. Ignition and Control Equipment.
39	The Beckwith Company, Dowagiac, Mich. Oil Burner.
40	Hardinge Brothers, Inc., Chicago. Oil Burners.

Why the Liberty Burner Is Best



1. *Low Priced.* Within the means of any family.
2. *No Soot, Smoke or Carbon.* Oil vaporized and mixed with air insures complete combustion.
3. *Quiet.* Practically without noise.
4. *Odorless.* No odor in house.
5. *Lasting.* No moving parts to wear out.
6. *Automatic.* Either thermostatic or manual control.

Exclusive Representatives Wanted

LIBERTY OIL BURNER COMPANY, INC.
1605 Leavenworth Street, Omaha, Nebraska

SIMPLICITY
UTILITY and
SAFETY IN
Oil Burner Control

CON-TAC-TOR

Beloit Wis.

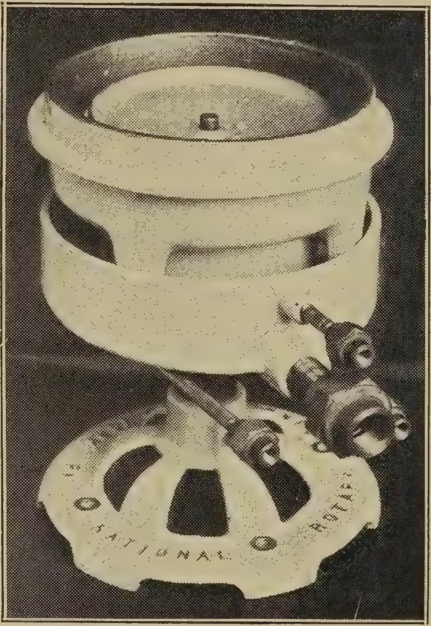
NEW CATALOG NOW READY

THE

"NATIONAL"

ROTARY OIL BURNER

The one users swear by—not at



NET PRICES TO DISTRIBUTORS

ELECTRIC DRIVEN, 1/20 H.P.	Net $108.
WATER PROPELLED	Net 50.

REGARDLESS of how good a burner you now have, you should have the superiority of the NATIONAL demonstrated to you.

A more perfect combustion.

A better burner because its construction is simple. That makes the price low, too. Less work to install. Any part serviced without removing the burner. For fully automatic, remote or manual control.

You can try it yourself without obligation. Your inquiry will bring all details. Territorial rights without stock purchase of burners.

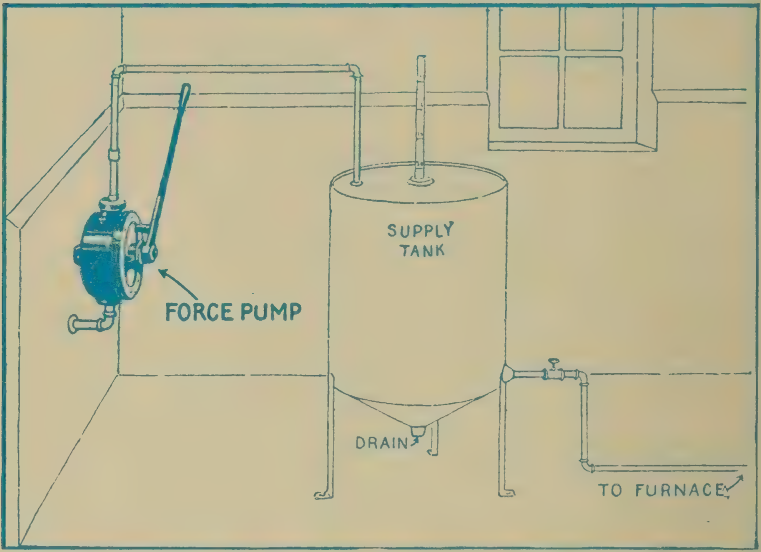
* * *

National Rotary Burner Co.

York, Pa.

Bell Phone 425-W

Insuring Your Oil Supply



THE efficiency of an oil burner is dependent upon a sure and continuous supply of oil.

Between the storage and gravity tanks is a pump which is second only in importance to the burner itself. It is the connecting link between the two and should it fail the burner would be helpless.

Force Pumps can be relied upon to function properly at all times. They are the oscillating, double piston type, the most reliable in pump construction, yet they have only one moving part. They are practically indestructible.

There are no gears or swiftly moving parts to cause friction, with its ever present danger of fire through static electricity, but, slow moving and frictionless, need no lubricating and petroleum distillates of all kinds can be safely handled.

With their powerful suction lift the storage tank can be located further from the house than is possible with any other type of pump made.

Your insistence that a Force pump be included in your installation will insure against failure of your fuel supply.

FORCE PUMP COMPANY

1821 BERTEAU AVENUE :: CHICAGO, ILLINOIS

Sheridan Drive and Sheridan Lake Apartment Building, Chicago, a recent addition to the large family of users of fuel oil and S. T. Johnson Co.'s Oil Burning Equipment. This installation was made by the Johnson Oil Burner Co., 3700 N. Clark Street, Chicago. The insert shows a Johnson Improved Rotary Type Oil Burner and the fire produced in the operation of large heating plants.

The S. T. Johnson Co., Oakland and San Francisco, Manufacturers of Commercial Oil Burning Equipment for twenty years, have recently made application for patents covering full automatic oil burners for domestic heating plants.

The New Johnson Automatic utilizes the same centrifugal principles of Atomization and Forced Draft so economically used on their industrial burner. The complete installation is however a marvel of simplicity and beauty of design.

The New Johnson Automatic Burner will be shown to the public, for the first time, at the American Association of Oil Burner Manufacturers Exhibition at Edgewater Beach Hotel, Chicago, Illinois, April 1, 2, and 3 and thereafter at 3700 N. Clark Street, Chicago, Illinois, and Distributors in all large cities.

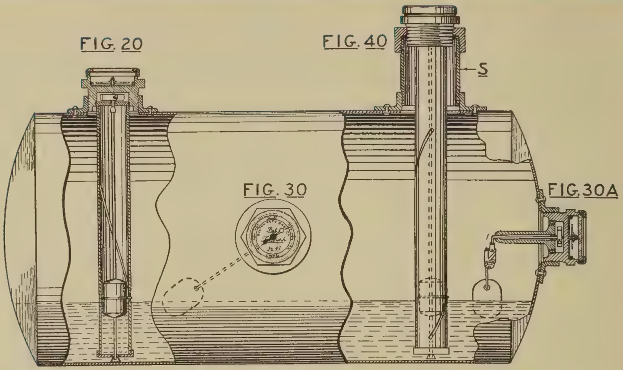


Fig. 20, Triumph No. 26 O. B. Upright gage, shown in section.

Fig. 30, Triumph Jr., No. 41 gage, applied to side of tank.

Fig. 40, Adaptation of Triumph No. 26 O. B. gage for storage tanks buried underground.

Fig. 30A, Triumph Jr., No. 41 gage shown in section, applied to dome end of tank.

"Triumph"

Magnetic Oil Tank Gages

are

Durable—Dependable—Safe

The indicating pointer on all models of the "Triumph" is a compass needle which is revolved by the turning of a magnet under a solid diaphragm. This makes the gage absolutely safe for use below the level of the fluid, for even if the glass becomes broken there is no opportunity for either the fluid or fumes to escape.

An actual test by the Underwriters' Laboratories showed that a pressure of 1500 pounds was necessary to cause a rupture of the diaphragm.

Eighteen years of gage manufacturing experience have gone into the perfection of this gage.

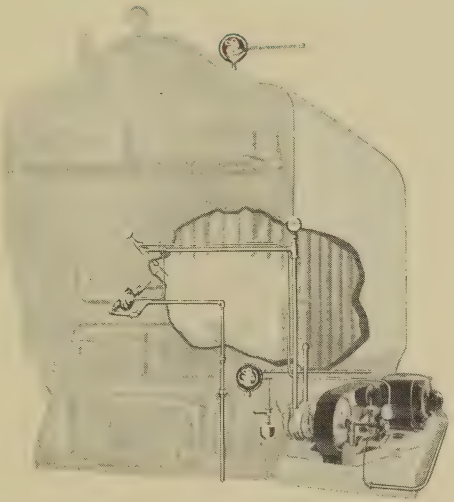
Write for details of Model Jr. No. 41 and Model 26 O. B., which are special designs for oil burning equipment and are listed as standard by the Underwriters' Laboratories.

The Boston Auto Gage Company
28 Clapp Ave. Pittsfield, Massachusetts

Listed as Standard by the Underwriters' Laboratories

MARVEL

FUEL OIL BURNER



THE MARVEL OIL BURNER is a simple mechanical device, designed to meet the ever increasing demand for a practical, economical domestic FUEL OIL burner.

MARVEL'S METHOD of atomizing the oil eliminates noise and spreads the flame over the entire heating surface of the boiler which was not built for an intensely hot condensed flame.

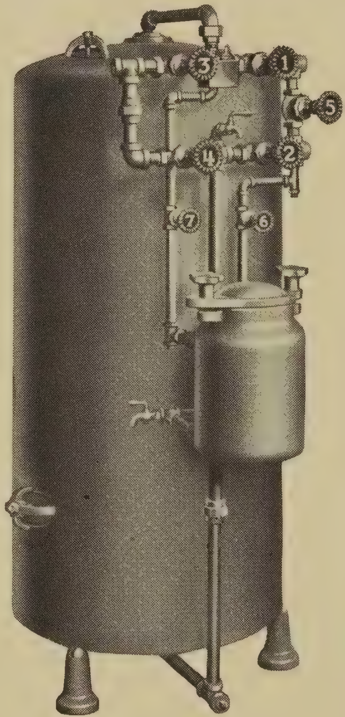
ATTENTION DEALERS

IF you are attending the convention we would be pleased to have you call at our main office 711 W. WASHINGTON BLVD., or get in touch with our representatives at the convention.

MARVEL OIL BURNER COMPANY
711 W. WASHINGTON BLVD., CHICAGO, ILL.

Oil Burner Distributors and Dealers

We have an interesting proposition to make you on the sale of Graver Household Water Softeners.



Oil burner prospects and users are all prospects for a water softener. You can keep your entire sales force busy the year around.

The Graver Water Softener is not a new proposition. It will live up to its guarantee, made by an old, responsible concern. Graver Corporation has built Water Softeners for over 15 years.

Installation is easy.

Sales and advertising helps are ready for you.

Priced to make you a good return on every sale and the market is ready for it.

Some very good territory is still open—Write giving territory covered and lines sold.

GRAVER *Corporation*

160 Todd Avenue, East Chicago, Indiana

The Place of Furnace Oil in the Oil Industry

By O. P. Keeney*

(Continued from the March Issue)

THE salesmen of the burner manufacturers will earn the regard of the Petroleum Industry if they do not stress the low price of furnace oil. Not because we may feel that all petroleum products are now being sold on too low a basis, but it may very well be that the increased demand for furnace oil will create a situation where furnace oil will deserve to be a preferential use for certain grades of petroleum, displacing some present uses. In such a situation a higher price for furnace oil would inevitably follow. The Petroleum Industry would prefer to see the burners sold only with such sales arguments and to such users as would not render likely the dismantling of oil burners, with the accompanying criticism of the Petroleum Industry, if a higher price for furnace oil is justifiable. Certainly if, as I have been informed, the manufacturers of gas burning household heaters have one-half of their entire markets in territories served by manufactured gas, the oil burner manufacturers do not need to dwell much on the low price of furnace oil.

One oil burner manufacturer refuses to let his salesmen quote comparative fuel costs, even telling them to say oil will cost more than burning coal, but that all the other advantages justify the installation of their oil burner.

In addition to the desirability of burners being capable of handling a comparatively wide range of products because of the steadying influence this would have on the price of furnace oil, this same flexibility would safeguard the question of there being a sufficient supply of furnace oil. With the growing consumption of all petroleum products, this question of supply deserves consideration. Certainly, the wider the range of product which can be satisfactorily used, the less immediate would be any danger of insufficient supply.

In Kerosene Cut

Despite these varying factors I assume that furnace oil generally comes somewhere within the kerosene and gas oil cuts. There are some who are not willing to concede that even during the next few years the demands for kerosene and gas oil for their previous uses can be met, and at the same time a greatly increased demand for furnace oil be met, without the creating of ill will resulting from some of the users being forced to relinquish their use of petroleum for more or less extended periods because of its increase in price.

Taking the number of dwellings

---

*Tidewater Oil Company

in the United States as of the year 1920, probably over 1.2 per cent of all the homes in this country have an oil burner. Until I figured this out I thought it would be a figure almost out of sight on the right of the decimal point. The consumption of furnace oil this year probably equals 4.5 per cent of all the gas and fuel oil that will be produced this year, or 24.5 per cent of the present production of kerosene, or 12 per cent of the gas oil alone.

Consumption Figures

If the present consumption of furnace oil is doubled, the consumption of this product would probably equal 9 per cent of all the gas oil and fuel oil, or 49 per cent of the kerosene, or 24 per cent of the gas oil alone. If the present consumption is quadrupled it would probably equal 18 per cent of all gas and fuel oil, or 98 per cent of the entire production of kerosene this year, or 48 per cent of the gas oil alone.

It seems possible that the field for domestic burners would be 2,500,000 homes. This would be 12 per cent of the total dwellings in 1920, 31 per cent of the homes wired for electricity, 37 per cent of the number of passenger cars other than Fords registered last year and 65 per cent of those reporting taxable incomes in 1921 of $2,000 or over. The consumption of furnace oil under these conditions might be ten times as large as at present. This consumption would probably equal 245 per cent of the present production of kerosene, or 120 per cent of the gas oil alone, or 45 per

SETS NEW RECORD

On Low Service Cost

OIL-O-MATIC, the remarkable new-type oil burner, by actual test, requires less servicing than a high grade washing machine. One service call for each 104 hours of running time was the best any electric washer could show. OIL-O-MATIC operated 1050 hours, ten times as long, with only three service calls. Two of those calls were for trouble not in the burner. The third was for a minor adjustment.

Get full information on the oil burner that has solved the burner problem. Some desirable territory still open for live dealers. Write today.

C. U. WILLIAMS & SON

Main Office and Plant
Bloomington, Ill.
Branches in all leading cities.

WILLIAMS
OIL-O-MATIC
HEATING

Pumps for Oil Burners

Dependable
Sturdy Construction
Quiet in Operation
Efficient Service

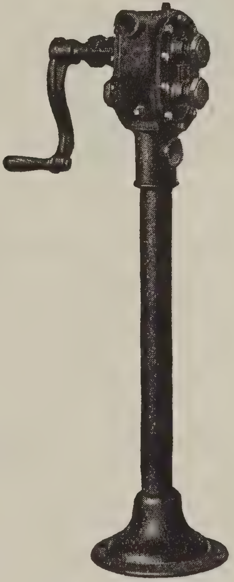


Fig. 3512

Fig. 3512, Hand Rotary Pump, ideal for use in connection with furnaces burning liquid fuel. It is chiefly used in transferring the oil from outside underground to auxiliary tank.

It has a capacity of 12 gallons at 100 R.P.M.

There are Trahern Pumps, both hand and power, to take care of every pumping necessity.

Let our Engineers help you solve your pumping problems. No obligation whatever.

GEO. D. ROPER CORP.

ROCKFORD REG. TRADE MARK TRAHERN REG. U.S. PAT. OFF. ILLINOIS

TRAHERN ***PUMPS FOR PERMANENCE***

cent of the total production of fuel oil and gas oil. Of course, the entire production of gas oil and fuel oil is not available for furnace oil because of the limitations of viscosity and cold test.

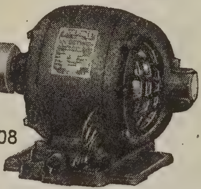
The complexity of the present situation and the possibilities of future developments of furnace oil are such as to warrant an intelligent, thorough and comprehensive study of the problem. My own conclusions are, that the oil burner manufacturers should most carefully and intensively study the various phases through an effective independent organization of their own, but one coordinated and cooperating with organizations of the petroleum industry.

The petroleum industry cannot afford to let this situation develop, like Topsy, without at least attempting in a serious way to foresee and direct its development. At least we should find out more about the situation than it is practicable for any one individual or unit in the industry working alone to ascertain.

Anderson Now with Johnston Company

H. A. Anderson has recently been appointed chief engineer for the Johnston Manufacturing Company, Minneapolis, Minn., builders of oil burning heating apparatus for railroads and industrial plants. Mr. Andersin was in the ordnance department of the United States Army during the war and has been with the Mahr Manufacturing Company, also of Minneapolis, for several years, the last two as chief engineer.

Emerson Motors
Single Phase, Polyphase and D. C.
(Interchangeable)



2508
2 *H.P.* *and* *Smaller*

For thirty years we have specialized in producing motors in these sizes.

The Emerson Electric Mfg. Co.
2018 Washington Ave., St. Louis, Mo.
50 Church St., New York City
(*We sell motors only to those buying for resale*)

Sun Oil Burner
Lowest priced successful burner for domestic and industrial installations. Easy to operate. Endorsed by leading contractors. Over 15,000 users.

DEALERS: Write for details and proposition. Good territory still open.

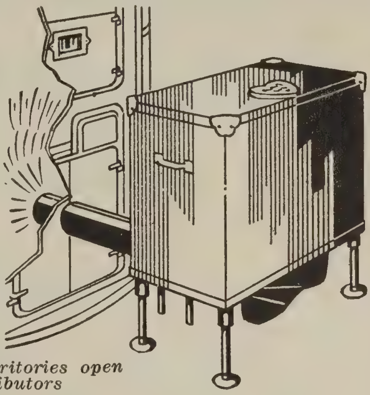
Heat Equipment Corp.
134 So. 13th St. Lincoln, Neb.

"Most Sensible Facts I Ever Read"

That's just what you would say if we could tell you here, the startling reasons why Hart Heat is preferred for safety and economy.

You'd be interested too in knowing how these new facts make Hart Heat easy to sell.

Write for this information.

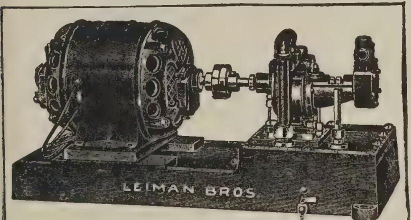


There are still a few territories open for responsible distributors

Hart Oil Burner Co.

"HART HEAT"

Department 101 **Peoria, Ill.**



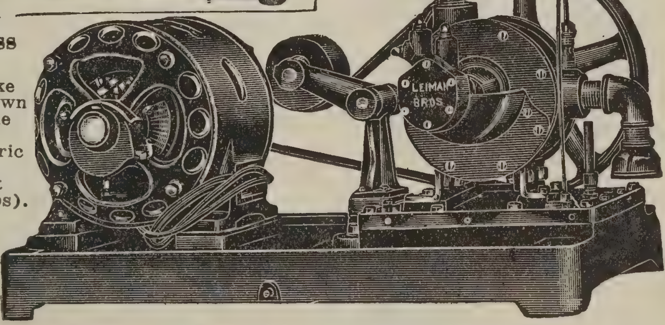
Leiman Bros. Oil and Air Units with self lubricating oil device. Both coupled and belted units in large and small sizes. Oil delivered to burner without fluctuation and atomized by the air supply.

Leiman Bros., 60 Lispenard St., N. Y.
Makers of good machinery for 35 years.

Dealers Wanted

Noiseless

The air pumps take up their own wear. The oil pumps are eccentric positive drive (not gear pumps). We also have oil control valves pilot control and strainers.



Recent New Oil Burner Company Incorporations

Binghamton Fuel Oil Heating Company, Binghamton, N. Y. Capital is $200,000. Will manufacture oil burners.

Arsenal Oil Burner Company, Baltimore, Md. Capital is $10,000. Incorporators are Wm. L. McGinnis, Clarence A. Fifer and Herman C. Koschwitz.

Boelke Oil Burner Company, Chicago. Capital is $10,000. Will manufacture oil burners and heating specialties.

Gill Oil Burner Company, Fall River, Mass. Capital is $25,000, with a common stock issuance of 250 shares, no par value. Incorporators are Francis B. Lyons, Thomas E. Lyons, Ellen Lyons and John Lyons, all of Fall River.

United Oil Burner Corporation, Boston, Mass. Capital is $75,000, with a stock issuance of 1500 shares, no par value. Will manufacture oil burners. Incorporators are Earl L. Ridley, Needham, Mass., and Eileen L. Flynn and John A Shaw of Boston.

Harvey-Whipple Oil Burner Company, Springfield, Mass. Capitalized for 1000 shares of stock without par value. The incorporators are Walter C. Harvey and Edward J. Dwyer of Holyoke, Mass., and Ray C. Whipple of Springfield.

Divilbiss Appliance Company, St. Louis, Mo. Will manufacture oil burners. Incorporators are Arthur J. Donnelly, George F. Ernst, W. R. Lynch and A. P. Divilbiss.

VIKING PUMPS

Free Book

Write to factory or nearest branch

Pump Quality

Utmost serviceability is built into the Viking Rotary Pump. Not only are best materials used, but an advanced pumping principle is embodied. Powerful and positive suction assures a steady delivery. Efficiency is high, yet operating and maintenance cost is low. Only 2 moving parts eliminate costly wear. 65,000 in use. NEW FREE BOOK packed with pump facts, should be on your desk. Send name for copy TODAY.

VIKING PUMP CO.
Cedar Falls, Iowa

B. F. Schirmer Co., Inc. - - - 342 Madison Ave., New York, N. Y.
Viking Pump Co. - - - - 549 W. Washington Blvd., Chicago, Ill.
Viking Pump Sales Co. - - - - - 204 Grand Ave., Milwaukee, Wis.
Viking Pump Co. of Canada, Ltd. - - - - - Walkerville, Ontario
Menge Pump & Mach. Co., Ltd. - 862 Tchoupitoulas St., New Orleans, La.
De Laval Pacific Co. - - - - - - 61 Beale St., San Francisco, Cal.
Kerr Machinery Corp. - - - - - - Kerr Building, Detroit, Mich.
Hayes Pump & Machinery Co. - - - - - 94 Pearl St., Boston, Mass.
The Schirmer Co. - - - - 750 Prospect Avenue, Cleveland, Ohio
Southern Engine & Pump Co. - - - - - - - - Houston, Texas
Power Equipment Co. - - - - - Oliver Building, Pittsburgh, Pa.
Walter H. Eagan & Co. - - - Stephen Girard Bldg, Philadelphia. Pa.
Walter O'Bannon Co. - - - - - 519-21 E. First St., Tulsa, Okla.
Norton Paper Goods Co. - - - 719 Delaware St., Kansas City, Mo.

The TIFFANY Oil Burner

—Now, More Than Ever—

"Gem of Domestic Oil Burners"

Consider a few of its new and original salient points:

Burns lowest gravity fuel oil distillate as efficiently as furnace oils.

Positive air balance, air and oil are always in correct proportion; adjustments are made while burner is in operation.

Electrical ignition, absolutely positive in action with any fuel at any time. No spark, no magneto, no transformer.

These are but few of the many original and exclusive features of the TIFFANY Oil Burner.

Mr. Dealer, YOU can't afford not to get acquainted with the wonderful new TIFFANY Oil Burner. A cordial greeting awaits you at Booth No. 9 at the Chicago show.

THE TIFFANY COMPANY

58 FIRST STREET NEWARK, N. J.

Exclusive Manufacturers and Distributors of
THE TIFFANY Oil Burner
Gem of Burners for the Home

NO RECENT ADDITIONS TO UNDERWRITERS' LIST OF STANDARD BURNERS

(*Continued from page* 16)

naces. Standard—when fuel storage capacity conforms to local requirements and installation made in accordance with requirements of inspection departments having jurisdiction.

Marking: "Caloroil" and "Caloroil, Type A" on name plate attached to float tank cover.

Electrol "Type S." Home Appliance Corp., St. Louis, Mo.

Oil burner designed to burn kerosene or distillate of 36 to 40 deg. Baumé, for installation in hot water heaters, steam boilers and hot air furnaces. Standard—when fuel storage capacity conforms to local requirements and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: Electrol "Type S" on name plate attached to blower housing.

Gill "Type G." Gill Manufacturing Co., Chicago, Ill.

Mechanical draft oil burner with a. c. electric motor drive. Temperature control—Automatic. Ignition—Gas pilot. Fuel—Distillate or furnace oil not heavier than 36 deg. Baumé. Fuel Feed—Suction from storage tank which must in all cases be located below level of pump. Designed for steam and hot water installations only. (Not for hot air installations). Standard—when fuel storage capacity conforms to local requirements and installation is made in accordance with requirements of inspection department having jurisdiction.

Marking—"Type G" on name plate attached to cabinet.

Hart "Type C." Hart Oil Burner Co., Peoria, Ill.

Oil burner designed to burn light distillate or gas oil of 30 to 32 deg. Baumé, having a flash point of not less than 100 deg. Fahr.; for installation in hot water heaters, steam boilers and hot air furnaces where alternating current and gas are available. Standard—when fuel storage capacity conforms to local requirements, and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: "Type C" on name plate attached to main burner cover.

"Inter-State." Inter-State Oil Co.,

GOULDS

Hand Rotary Pump for Fuel Oil Systems

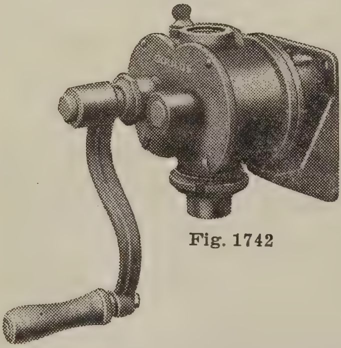


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings.

Furnished with or without bracket for attaching pump to side wall.

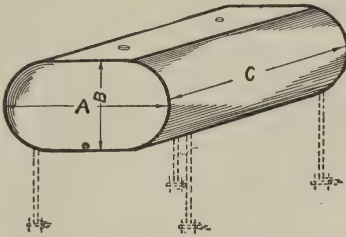
Capacity—10 gallons per minute.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. **Seneca Falls, N. Y.**

Atlanta Chicago New York Pittsburgh
Boston Houston Philadelphia Washington

Maxwell Fuel Oil Tanks



This OVAL TANK

of No. 10 Gauge steel is designed especially for cellar installations. The 27 inch measurement will go thru an ordinary cellar door.

SPECIFICATIONS

Capacity Gal.	Dimensions Inches A	B	C	Weight Lbs.
200	42	27	50	320
275	42	27	66	375

Cylindrical Fuel Oil Tanks

Our stock includes popular sizes of tanks from 60 to 10,000 gals. We make daily shipments by truck, express and freight.

Write for our Catalogue.

EARL C. MAXWELL CO.

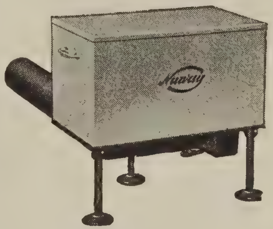
93-123 Thirteenth St. Brooklyn, N. Y.

Service Records Tell the Story

The Nu-Way Automatic Oil Burner is simply constructed with few moving parts—no sensitive valves, no temperamental diaphrams or similar contrivances to get out of order.

More than two hundred Nu-Way installations have been in constant use for over two years. Service records showing actual maintenance costs for these burners bear testimony to the simple, efficient and dependable Nu-Way Automatic Heating Service.

We invite financially responsible dealers to write for these service records. Also our booklet "Home Heating Supremacy."



AUTOMATIC OIL BURNER
Nu-way
FOR HOME HEATING

Dooley & Braden Co.
4504 Sixth Ave.
Rock Island, Illinois

Sioux City, Iowa.

Manually-controlled, oil-vapor burner designed to burn light distillate or kerosene of 38 to 42 deg. Baumé, having a flash point of not less than 120 deg. Fahr. or higher than 180 deg. Fahr., for installation in hot water or steam boilers and hot air furnaces. Standard—when fuel storage capacity conforms to local requirements, and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: "No. 16-A" or "No. 10-A" "Type U" on circular name plate attached to top of Basel Control housing.

Johnson "Type 22." Johnson Co., S. T., San Francisco, Calif.

Manually-operated oil burner, pump feed type, without automatic means for closing oil supply to the burner in event the flame is extinguished. Designed to burn fuel oil 24 to 36 deg. Baumé, and suitable for installation in hot water boiler, steam boiler and hot air furnaces. Standard—for use where a competent attendant is constantly on the premises and when fuel storage conforms to local requirements and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: "Type No. 22" on etched brass name plate attached to rear of blower housing.

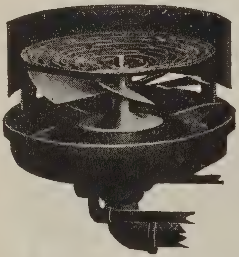
Kleen Heet "Types G, GJ and E" Oil Burners. Winslow Boiler & Engineering Co., Chicago, Ill.

Oil burners designed to burn light distillate gas oil or kerosene of 36 to 40 deg. Baumé and a flash point of not less than 105 deg. Fahr. or higher than 190 deg. Fahr., for installation in hot water heaters, steam boilers and hot air furnaces. Type G, Nos. 8, 13, 16, 19, 56 and 80; Type GJ, Nos. 6, 10 and 15; Type E, Nos. 14, 20, 50 and 75. Standard—when fuel storage capacity conforms to local requirements, and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: Type letter and size number on etched brass name plate attached to blower housing.

Lillibridge "Types 38-D, 68-D, 99-D, and 9-11-D." Lillibridge Heating Corp., Hutchinson, Kan.

Manually-controlled, oil-vapor burner designed to burn kerosene or distillate of 36 to 40 deg. Baumé, for installation in hot water and steam boilers. Standard—when fuel storage capacity conforms to



The Rotary Oil Burner

is designed for use in steam and hot water heating systems, hot air furnaces, water heaters, ranges, etc. It produces maximum furnace efficiency by vaporizing the oil and mixing the oil-gas with the proper amount of oxygen, at the point of combustion. Uses fuel distillate of 27 to 36 gravity.

ROTARY MANUFACTURING COMPANY
1526 Santa Fe Avenue **Los Angeles, Calif.**

Eastern Manufacturer, 1934 Market St., Philadelphia, Penn.
Established 1908 Handled by distributors
Chicago, St. Louis, San Francisco, Oakland and others

WESTINGHOUSE ELECTRIC

Preference

Preference for a reliable motor for oil burners has resulted in the adoption of Westinghouse motors as standard equipment by the leading oil burner manufacturers.

This preference is also reflected in the fact that there are more Westinghouse motors used on oil burners than any other make of motor.

Westinghouse engineers will assist you in selecting the most suitable type of motor for your oil burner.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of the United States and Foreign Countries.

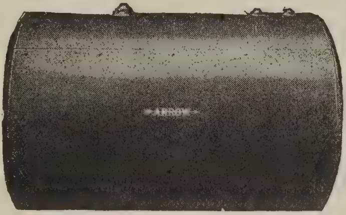
Westinghouse

»ARROW➤

Unconditionally

Guaranteed

Oil Storage Tanks



The Novelty Steam Boiler Works Co.

929 S. Howard St., BALTIMORE, MD.

Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers." It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York
Branch Offices in the Larger Cities

local requirements, and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: "Types 38-D, 68-D, 99-D or 9-11-D" cast on front of burner.

Nokol. American Nokol Co., Chicago, Ill.

Mechanical draft oil burner with a. c. or d. c. electric motor drive and gas pilot ignition. Automatic electric control. Fuel to be used—Kerosene or distillates not heavier than 36 deg. Baumé and with flash point not lower than 100 deg. Fahr. Fuel supplied to combustion chamber by suction from float chamber and to float chamber by gravity. Designed for hot water, steam and hot air installations. Standard—when fuel storage conforms to local requirements and installation is made in accordance with requirements of inspection department having jurisdiction.

Marking: "Nokol" on name plate attached to housing.

Oliver "No. 30A." Oliver Oil-Gas Burner Co., Inc., St. Louis, Mo.

Manually-operated, oil-vapor burner designed to burn kerosene or distillate of 38 to 40 deg. Baumé, for installation in hot water and steam boilers and hot air furnaces. Standard—when fuel storage capacity conforms to local requirements and installation is made in accordance with requirements of inspection department having jurisdiction.

Marking: "No. 30A" cast on manifold of burner and on name plate attached to anti-flooding device.

Quinn. Quinn Oil Burner Corp, Port Richmond, Staten Island, N. Y.

Manually-controlled, oil-vapor burner designed to burn kerosene or distillate of 36 to 40 deg. Baumé, for installation in hot water and steam boilers and hot air furnaces. Standard—when fuel storage capacity conforms to local requirements and installation is made in accordance with requirements of inspection department having jurisdiction.

Marking: "Quinn Oil Burner" cast on automatic cut-off.

Rotary "Type B." Rotary Mfg. Co., Los Angeles, Calif.

Manually-controlled oil burner equipped with oil trap to prevent discharge of oil to sewer. Designed to burn fuel oil, gas oil or distillate, having a specific gravity of 28 to 40 deg. Baumé, and a flash point of not less than 150 deg. Fahr. Suitable for installation in hot water heaters, steam

WRITTEN INSTRUCTIONS

Are preferable to verbal, and will assure the writer that they will be carried out more quickly and correctly. Keep carbon copy for future reference.

To Leod D. Becker, Pres.
"Fuel Oil"

Date Mar. 9th '25

Subject: "Summerheat" Oil Burner.--

Please say to the industry that the first public showing of "Summerheat" will be made at the convention in Chicago April 1-2-3.

Signed Gen. Mgr.
The Electromatic Appliance Corp.
Hamilton, Mo.

TANKS

OBROUND TYPE

Also DUPLEX and CYLINDRICAL TYPES

All Sizes—Write for Prices

KAUSTINE Co., Inc.

Buffalo, N. Y.

Quality Oil Pumps

HAND or POWER

We Can Fit
Our Designs
to Your Needs

Send Us Your Pump Problems

Columbia Industrial
Machinery Co.
4020 W. Lake St.
CHICAGO

boilers and hot air furnaces. Standard—when fuel storage capacity conforms to local requirements and installation is made in accordance with requirements of inspection department having jurisdiction.

Marking: "Type B" on burner casting, oil trap covering, and strainer fittings.

Industrial

Ballard "Type H." Ballard Oil Equipment Co., Inc., New York, N. Y.

Low-pressure, mechanical atomizing burner system consisting essentially of pump set, burners, oil heaters, relief valve, remote control switch, electrical control cabinet and tank gage. Suitable for use in steam heating boilers when using preheated oil of 12 to 14 deg. Baumé. Standard—for use where a competent attendant is constantly on the premises and when fuel storage conforms to local requirements and installation is made in accordance with requirements of inspection departments having jurisdiction.

Marking: "Type H" on brass master plate attached to base of pump set and similar type letter on other above mentioned units of system.

According to E. J. Smith, oil and gas engineer in the Laboratories, several burners were to undergo the Underwriters' Laboratory tests during March and it seemed possible, early in the month, that one or two additions to the Standard List would be made on April 1.

Costly Machinery in New Williams Plant

Machinery necessitating an expenditure of $70,000 will be installed in the new plant which is being built at Bloomington, Ill., by C. U. Williams and Son, manufacturers of the Oil-O-Matic burner, according to a recent announcement. This, added to the cost of the building itself, will bring the total expenditure to $125,000. Construction is proceeding rapidly under the direction of a Chicago firm which was awarded the contract.

Mr. C. H. Chalmers General Manager of the Chalmers Oil Burner Company, will be at the convention and will be glad to talk with those interested in representing the Chalmers Oil Burner.

CHALMERS OIL BURNER CO.
1234 Central Ave., N. E.
Minneapolis, Minnesota

Members Am. Ass'n Oil Burner Manufacturers

Fuel Oil Consumption by Locomotives Increases in 1924

A TOTAL of 63,206,034 barrels of fuel oil was consumed by locomotives of the principal railroads in the United States in 1924, compared with 58,005,295 barrels in 1923, according to returns received from railroads by the American Petroleum Institute. These figures include fuel oil consumed in all classes of service.

The total consumption of 63,206,034 barrels in 1924 was made up of 51,251,563 barrels of domestic fuel oil and 11,954,471 barrels of Mexican fuel oil. In 1923, of the total consumption of 58,005,592 barrels, 46,407,231 barrels were domestic oil and 11,598,064 barrels Mexican fuel oil.

Classified Geographically

It has been found impracticable to separate the locomotive use of fuel oil by the usual railroad or I. C. C. districts, but an attempt has been made to classify the use by geographical districts as follows: Eastern, Southern, Middle Western, Southwestern, Southwestern Pacific and Northwestern.

The largest consumption of fuel oil was shown in the Middle Western and Southwestern district, totaling 32,651,547 barrels in 1924 divided into 22,274,891 barrels of domestic fuel oil and 10,376,656 barrels of Mexican fuel oil. This compares with 27,448,445 barrels in 1923, of which 17,126,042 barrels were domestic fuel oil and 10,322,403 barrels Mexican fuel oil.

Consumption in the Southwestern Pacific district totaled 22,123,353 barrels in 1924, compared with 23,270,602 barrels in 1923, all this oil being domestic fuel oil. The Northwestern district totaled 6,846,046 barrels, compared with 6,002,481 barrels in 1923, all domestic fuel oil. In the Southern district the total was 1,469,858 barrels in 1924, compared with 1,150,205 barrels in 1923, all Mexican fuel oil.

In the Eastern district the consumption totaled 115,230 barrels, of which 7,273 barrels were domestic fuel oil and 107,957 barrels Mexican fuel oil. This compared with 125,456 barrels consumed in 1923, of which 8,106 barrels were domestic fuel oil and 125,456 barrels Mexican fuel oil. The above figures are practically complete for all roads using fuel oil, only a few small lines consuming very little oil having failed to make returns. The figures for 1923 are revised, and figures for 1924 are subject to revision.

Homer Burner in New Hands

The Homer Oil Burner, formerly the product of the American Oil Heating Corporation, West Townsend, Mass., is now being manufactured by the Bethlehem Shipbuilding Corporation, Ltd., Boston, under the supervision of George Lawrence and G. E. Johnstone.

Gill

AUTOMATIC

Oil Burner

Sheer merit is the basic reason why heating engineers strongly recommend the Gill Automatic Oil Burner and why the Gill distributorship is most profitable.

Simple in construction—positive in operation, Gill Automatic Oil Burners give complete satisfaction.

You do not have to spend your profits servicing a Gill Burner.

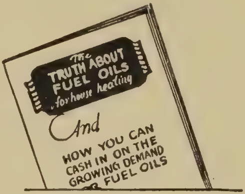
Gill Manufacturing Co.

8300 South Chicago Ave.
Chicago, Illinois

Write for details of our selling franchise

"The Truth About FUEL OIL for House Heating"

—An Empire Contribution To a Growing Industry



After having made a wide investigation of the domestic, househeating market for fuel oil, we have published our conclusions in a handy little booklet entitled, "The Truth About Fuel Oil for House Heating."

This little booklet is already in its second edition and has created a great deal of interest among oil men and burner men all over this country and in many other parts of the world.

You are invited to write our Tulsa office for a copy now. There's no obligation.

CITIES SERVICE OILS

ONCE-ALWAYS

EMPIRE REFINERIES, Inc.

Subsidiary Cities Service Co.

General Offices, Tulsa, Oklahoma

Offices: New York, Philadelphia, Cleveland, Chicago, St. Paul, Atlanta, New Orleans, Kansas City, St. Louis, Ft. Worth

Consulting Page

Editor, FUEL OIL:

Referring to page 72 of the March issue of FUEL OIL and particularly to a letter of Mr. Vernon E. Vining, Sec'y and Treas. of the Oil and Electric Heater Company, I beg to say that I have just communicated with the National Board of Fire Underwriters, and this is what they say:

"Hart 'Type C.' Hart Oil Burner Co., Peoria, Ill.

"Oil burner designed to burn light distillate or gas oil of 30 to 32 degrees Baume, having a flash point of not less than 100° F.; for installation in hot water heaters, steam boilers, and hot-air furnaces where alternating current and gas are available. Standard—when fuel storage capacity conforms to local requirements and installation is made in accordance with requirements of inspection departments having jurisdiction.

"Marking: 'Type C' on name plate attached to main burner cover."

You will see from the above that I was right. What I said in my February article in FUEL OIL is still true. The Underwriters have not as yet approved any domestic burners to burn anything else but gas oil, kerosene distillate, or kerosene.

Yours very truly,
C. H. CHALMERS,
General Manager,
Chalmers Oil Burner Company

Q. A peculiar substance like sulphur seeps through the seams of our new stack since we began using fuel oil. Could you give us the cause and remedy?
B.E.A., Washington, D. C.

Ans. The substance is probably made up of resinous bodies—asphalt, etc.—that are discharged from the combustion chamber unburned and are carried up into the stack with the smoke and deposited on the sides of the stack. You are probably burning an oil with a high sulphur content and some of this naturally is carried over also. When an unlined steel stack is used, water invariably condenses on the inside, due to the hot gases striking the colder metal.

Another possibility is that the flue gases contain a good percentage of sulphur dioxide (SO_2). This gas combines with the water (H_2O) to form sulphurous acid (H_2SO_3). This would naturally attack the metal of the stack, forming an iron sulphate which might be diluted with water and more acid and absorb other compounds until its viscosity and volume reach a stage where it will flow, drip or seep through the seams in the manner you describe.

In either case the remedy is to line the stack for a good distance above the base, and test the flue gases for sulphur. If the content is too high, your combustion is inefficient, and steps should be taken to correct it. The lining acts as an insulation and water is less apt to condense in the stack. A change to an oil with a lower sulphur content may be necessary, also.

Q. In one of your issues last fall you published an article dealing with the use of oil burners in hot air furnaces. We would like very much to have a copy of that issue, if possible.—S. & T. Co., Louisville, Ky.

Ans. The article you refer to appeared in the September, 1924, issue, and was entitled: "Advantage of Oil Burning in Warm Air Furnaces." The author was F. E. Mehrings, of the Meyer Furnace Co., Peoria, Ill. Unfortunately we have no more copies of that issue to send you, for it was a special "Heating the Home Number" and we have had so many calls for copies that our supply has been exhausted. However, we will be glad to make a typewritten copy of the article for you, upon receipt of your order and $1.50, to cover copying costs, postage, etc.

Q. Please give me all information you have about steam and air atomization and the merits of both.—W. N. B., Buffalo, N. Y.

Ans. Atomization is a subject that would require more space for discussion, if we do it justice, than we can spare in this column or give you in a letter. The article by Chapin Tyler in this issue will give you some good information on various atomization costs. For complete information on the theory of atomization and the methods of obtaining it, we can refer you to no better text than "Fuel Oil and Steam Engineering," by Sibley and Delaney. It contains 450 pages of pertinent and worthwhile advice to anyone interested in oil burning. It can be obtained from **Fuel Oil**. The price is $5, check to accompany order. To the subject of atomization it devotes fifteen full pages and 13 graphs, giving explanatory curves and charts.

Q. Can you tell me how the average burner manufacturer determines the number of burners each distributor should sell in a given territory? Also, what do you consider the saturation point in the selling of oil burners? D. F. B., Davenport, Iowa.

Ans. The quota alloted to each distributor is generally determined by (a) the number of homes owned by those living in his territory; (b) the average income of those living in the territory; (c) competitive conditions, both in regard to other burners and as regards other fuels.

The saturation point, of course, varies according to these factors. In districts where natural gas or coal are plentiful and cheap, it would be low, while in other localities, more favorable to the use of oil, or adjacent to oil burner manufacturing centers, it would be high. In Bloomington, Ill., the home of the Williams Oil-O-Matic, for instance, one burner has been installed for each 10 homes in the city.

Q. We are very much interested in getting an oil burner nozzle that will spray oil mist through a drill hole, size 45 to 50, at an angle of 45 degrees from horizontal for our particular purpose. A pressure of 50 to 100 lbs. will be available. Any oil may be used, under any pressure. W. K., St. Louis, Mo.

Ans. It would seem that an ordinary steam or air jet atomizing nozzle would serve your purpose, as either can be made in any desired size, or can be arranged at any angle. It might be best to submit your problem to a competent oil burning engineer. John C. Hornung, 343 S. Dearborn St., Chicago, should be able to help you.

Honeywell Opens Chicago Office

Offices have been opened in the Strauss Building, Chicago, by the Honeywell Heating Specialties Company, Wabash, Ind., according to a recent announcement. William J. Hajeck is in charge.

NIAGARA OIL METERS

Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.
2926 Main St.
Buffalo, New York

Bird Oil Burner

Some Good Territory left for the right parties.

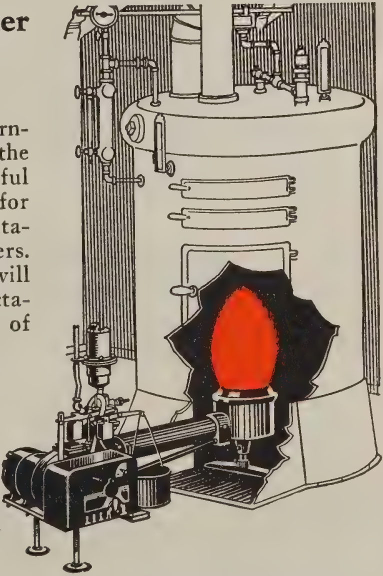
Three Years of Proven Success

A high class burner at a price one can afford.

Hundreds of Bird Burners are in use all over the country. Their successful operation has won for them an enviable reputation among home owners. It is a burner which will meet your every expectation, and assure you of satisfaction.

Write Today For Information

BIRD
BURNER CO.
Minneapolis, Minn.



BLACKMER Announces

Model 13 Direct Connected

A small capacity Fuel Oil Pump for Domestic and Industrial use.

This pump, a Blackmer in every respect, can be set to deliver, without fluctuation, any desired gallonage up to 3 G.P.M., by means of the specially designed by-pass with needle valve control.

Direct connected through a pressed steel, flexible coupling to 1/8 H.P. Emerson Motor. Operates easily on ordinary lamp circuit. Occupies floor space 16½ in. by 7½ in.

BLACKMER
ROTARY PUMPS

They Adjust as they Pump

BLACKMER ROTARY PUMP Co.
Petoskey, Mich.
Branches in nineteen principal cities

A New FUEL OIL PUMP

Look for it at the

A.A.O.B.M. Exhibit, Booths 10 and 11.

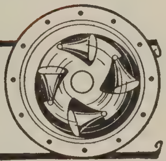
To provide a good rotary pump of small capacity, especially suited to fuel oil use, the Blackmer Rotary Pump Co., makers of rotaries for twenty years, developed the Model 13. It embodies the well known Blackmer Principle of automatic take-up for wear, and has the added advantage of accurate, needle valve control of flow, regardless of change of motor speed.

See it at our Booth or write our nearest branch for literature.

BLACKMER
ROTARY PUMPS

They Adjust as they Pump

BLACKMER ROTARY PUMP Co.
Petoskey, Mich.
Branches in nineteen principal cities



Distributors Wanted

Oil Burner Manufacturer marketing a burner of proven efficiency in use from Maine to California wants able and conscientious distributor in all open territories. This is a rare opportunity for an energetic man. Needham Oil Burner Company, 337 W. Madison St., Chicago.

U.S. GAUGE CO. N.Y. GAUGES U.S. GAUGE CO. N.Y.

PRESSURE—VACUUM

All sizes and types for every purpose.

Service our Solicitor

U. S. GAUGE CO.

308 W. Randolph St.
Chicago

44
Beaver St.
New York

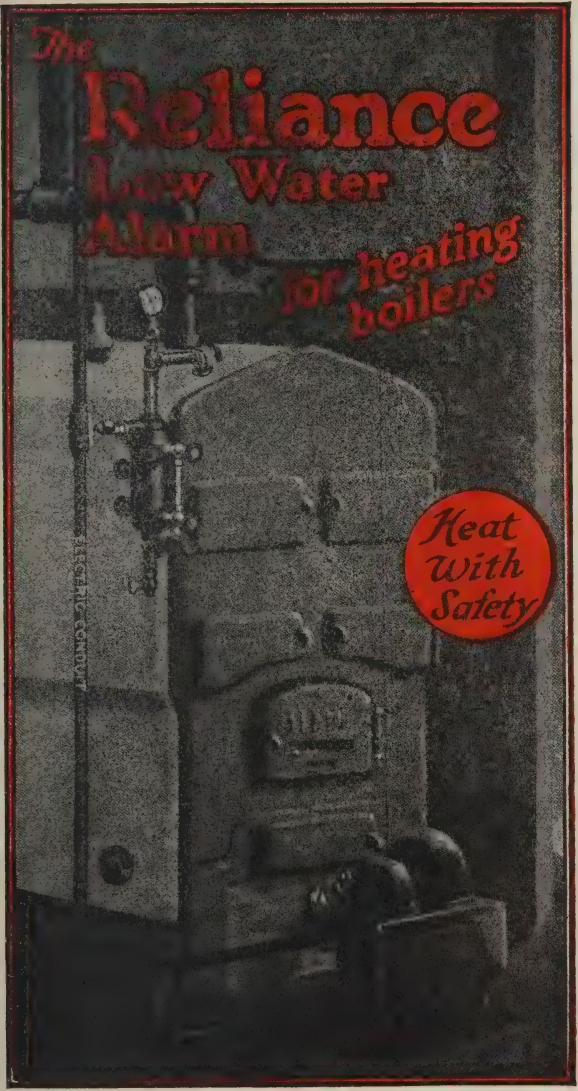
Oil Burner and Coal Efficiency Tests Unfinished

Tests being conducted by the Bureau of Public Roads of the Department of Agriculture at Washington to determine the comparative efficiency of oil burners and anthracite and bituminous coal for domestic use are still in progress, according to S. H. McCrory, chief of the Division of Agricultural Engineering, and no report can be made on them as yet. It is said that these tests are the result of hundreds of inquiries that have been received by the Department of Agriculture from farmers' wives, all over the country, asking for information in the matter.

Part of a letter from Mr. McCrory to FUEL OIL follows: "The tests have not been completed, and until the work is done and the final report published we cannot make public any of the data obtained. Publication of any of the data so far obtained would not be justified, since our information is incomplete, and publication of any of it might be misleading and might very possibly lead to complications that would be difficult to rectify. In justice to all who may be interested, we have adopted the policy of withholding all information until the work has been completed."

Announces New Burner

M. S. St. Clair of Galt, Ontario, has announced the development of a new automatic burner. It uses electric ignition and will burn low gravity oils, according to Mr. St. Clair.



In case of low water, this alarm gives a signal upstairs and cuts out the motor on the Oil Burner.

See this device at the Annual Meeting of the American Assn. of Oil Burner Mfrs. in Chicago April 1, 2, 3

◆

If not attending the meeting, write for complete information

◆

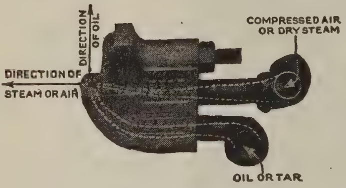
The Reliance Gauge Column Company

5956 Carnegie Avenue
Cleveland, O.

Manufacturers of Safety Water Columns for 40 years, nearly 100,000 in use

W. N. BEST

Oil Burners



The BEST since 1890

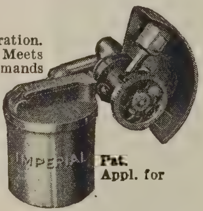
W. N. BEST Corporation

11 Broadway, New York City

IMPERIAL OIL CONTROL

And Safety Trip Valve

Positive operation.
Easy to install. Meets
all service demands
better.



Approved by
Underwriters
Laboratories

Pat.
Appl. for

Other Imperial Oil Burner
Specialties are:

Safety Trip Valves
Indicator Valves
Oil Strainers
Shut-off Cocks
Needle-Valve Drain Cocks
Copper Tubing
Oxygen Carbon Burning Outfits
Brass Pipe Fittings
Tubing Couplings
Angle and Globe Needle Valves

Write for catalog of sizes and prices.

The Imperial Brass Mfg. Co.
1224 W. Harrison St. Chicago, Ill.

COMPARING THE COST OF FIVE METHODS OF ATOMIZING FUEL OIL

(*Continued from page* 14)

5. *Operation.* On the basis of 24 hours per day, 300 days per year, 1000 gal. of oil per day is used in a 150-hp. plant, assuming:

a. Oil ....7.85 lb. per gal.
b. Oil ....19,000 B.t.u. per lb.
c. Boiler efficiency.80 per cent at full load

6. *Labor.* No charge for labor is included in the cost of atomizing oil.

Table I gives the cost items as calculated on the basis of the foregoing data. From this table, the cost of atomizing 1000 gal. of oil is plotted against equipment capacity, as shown by Fig. 1.

A study of the curves in Fig. 1 will show that the size of the plant has but little effect on the cost of atomizing oil. This is because the expense items of atomization, with the exception of fixed charges on the plant, are directly proportional to the quantity of oil atomized. Another important point is that in no case is the cost of atomizing fuel oil a determining factor in the choice of fuels. Fluctuation in the price of fuel oil is the big factor. For example, a change of 1c. in the price of oil is relatively unimportant, as compared to the cost of atomization.

Choice of equipment is governed largely by operating conditions. In a small plant, operated constantly at a normal load, a steam atomizing system will give a high efficiency, and at a comparatively small initial capital investment. Steam atomizing systems are relatively in-

Oil Burning Books

Burning Liquid Fuel

By William Newton Best

$4.00

A practical treatise on perfect combustion of oils, giving analyses, calorific values and heating temperatures of various gravities with information on design and proper installation of equipment for all classes of service.

Fuel Oil and Steam Engineering

By Robert Sibley and C. H. Delany

$5.00

An unusually complete treatment of fuel oil, for the central station man, the power plant operator, the mechanical engineer and the student.

Oil Fuel for Steam Boilers

By Rufus T. Strohm

$2.00

Describing the principles that underlie the use of oil as a fuel in steam boiler practice; the form and action of various types of burners; arrangement of furnaces for burning oil under different kinds of boilers; the operation of accessories such as pumps, heaters and cleaning devices; the methods of storing oil.

Industrial Uses of Fuel Oil

By F. B. Dunn

$3.25

Practical exposition of the use of fuel oil for industrial purposes, giving much specific information gotten through first hand experience.

Liquid Fuel and Its Apparatus

By William H. Booth

$4.00

Descriptions of various systems and apparatus; information on petroleum production and handling; and explanations of combustion principles and theories.

Prompt Attention Is Given to All Orders.
Check should accompany order.

FUEL OIL *for Heat and Power*
350 Madison Ave. New York City

Your Control Problems

Solved and Service Calls Eliminated by Dependable, Long-Lived

CON-TAC-TOR Mercury Controls

High and Low Voltage Room Thermo Switches, Boiler Safeties, Time Limit Switches, Magnetic Valves, etc. A complete Automatic Line.

ABSOLUTE CON-TAC-TOR CORPORATION
BELOIT, WISCONSIN

KELLOGG COMPRESSORS

Air Compressors.

Vacuum Pumps.

Special Oil Burning Equipment.

Our engineering and production departments are at your service in increasing your output of Oil Burners.

Send Direct

KELLOGG
MANUFACTURING
COMPANY
Rochester, New York

flexible, however, and at high loads are not as efficient as are mechanical atomizing systems. Thus the greater initial investment of the latter type is often justifiable.

(From *Chemical and Metallurgical Engineering,* by permission).

Heating Engineers Discuss Oil Burning in Chicago

Good attendance and lively discussions were features of the meeting of the Illinois chapter of the American Society of Heating and Ventilating Engineers, held in Chicago, March 9. Homer Linn, executive engineer for the American Radiator Company, gave the principal address, on furnace oil and its uses, quoting from recent issues of FUEL OIL. The sentiment of the meeting, expressed during the period allowed for discussions, was that there is a crying need for heat engineering in connection with oil burner installations and sales, and that it would be to the mutual advantage of the heating engineer's profession and the oil burner industry to establish close and cordial relations.

Company Changes Its Name

According to a recent announcement, the name of the Hart Oil Burner Company, Peoria, Ill., has been changed to the W. B. Wilde Company. The personnel of the organization and the trade name "Hart Heat" will remain the same, however. Mr. Wilde has been the largest stockholder, as well as president and manager of the original company since its organization.

WRITTEN INSTRUCTIONS

Are preferable to verbal, and will assure the writer that they will be carried out more quickly and correctly. Keep carbon copy for future reference.

To Leod D. Becker, Pres. Date Mar. 9th, 1925
Fuel Oil

Subject: "Wintercold" Electric refrigeration.--
Please advise "Fuel Oil" readers that the much discussed "Wintercold" will presently be ready for public showing.
"Wintercold" is our new electrical refrigerating unit, and it will be as sensational as "Summerheat" automatic fuel oil burners and just as revolutionary.
"Summerheat" will be on view at the Chicago convention, April 1-2-3.

Signed Gen. Mgr.
The Electromatic Appliance Corp.
Hamilton, Mo.

NATIONAL AIROIL BURNER

Airoil Burners
"are efficient"

The Complete Design
and Installation of
Oil Burning Systems

**National
Airoil Burner Co.
916 Thompson Street
Philadelphia**

WE SPECIALIZE
IN
FUEL OILS
GAS OILS
FOR DOMESTIC OR
INDUSTRIAL PLANTS

DELIVERED EITHER IN
TANK TRUCKS OR
TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

OHIO REFINING COMPANY
TELEPHONE RIDGE 884
CINCINNATI, OHIO

REFRACTORIES FOR OIL-BURNING BOILERS

(*Continued from page* 10)

company was probably the first to produce on a commercial scale in the electric furnace. The beautiful core of pure crystals coming from the furnace ingots is crushed, ground, and purified for shipment to an eastern manufacturer of spark-plugs. The surrounding sheath of sillimanite which averages better than 90 per cent sillimanite compound, is broken and ground, to be purified and made into a paint which when applied to the furnace wall and is heated, becomes converted into millions of tiny sillimanite crystals surrounded by a thin film of glass which closes the pores between the crystals and effectually seals the pores in the exposed face of the brick.

Meets Test

We have thus provided a brick that will easily bear the load at the temperature employed if it is used out of contact with reducing vapors, and we have so sealed its surface pores that these vapors cannot penetrate it. We have at the same time retained that porosity and resiliency so necessary to withstand the shock of sudden changes in temperature.

There is but one feature we have overlooked, that is, the vibration and pounding that comes from the combustion of the fuel. In Tylox, however, we have provided a continuous mechanical interlocking bond between the shell of the boiler setting and the innermost face of the refractory lining. We have thus threefold insurance against change

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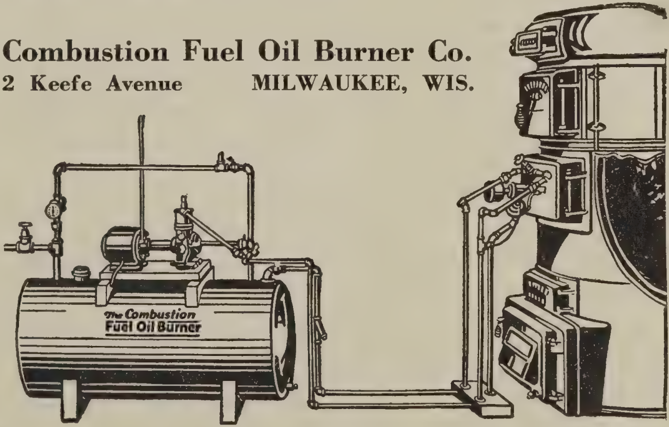

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in volume which ordinarily results in leaning walls. Even though the glaze does not completely protect the brick from penetration of reducing gases, we have tied the wall to the cold, strong, outside support.

The suggested solution to the problem, therefore, becomes: The selection of a brick of sufficient load-bearing ability to remain rigid at temperature used; to have in the body composition mere traces of free impurities so that gradual vitrification within the body may be avoided or retarded; to coat the face of the brick with a refractory crystalline glaze that will seal the pores but will not drip, cut back, and hasten destruction; and, lastly, to tie the face of the wall to the outer support so that the effects of vibration are minimized.

That is our specification. If air cooling is desired, we favor it highly since, if the preheated air is used for combustion, no loss in efficiency is suffered, and the brickwork is certainly helped out tremendously. But no amount of air cooling will make possible the elimination of any one of the three requisites I have described, so long as we use clay refractories.

Cook Electric Develops New Burner Pump

A new pump, known as the "Type F," has been developed by the Cook Electric Company, Chicago, according to a recent announcement. It is equipped with automatic safety devices. The new pump, with other Cook products, will be exhibited at the Convention in Chicago, April 1, 2 and 3.

FUEL OIL
FOR HEAT and POWER

Devoted to developing and encouraging the efficient, scientific use of oil fuels.

Published Monthly

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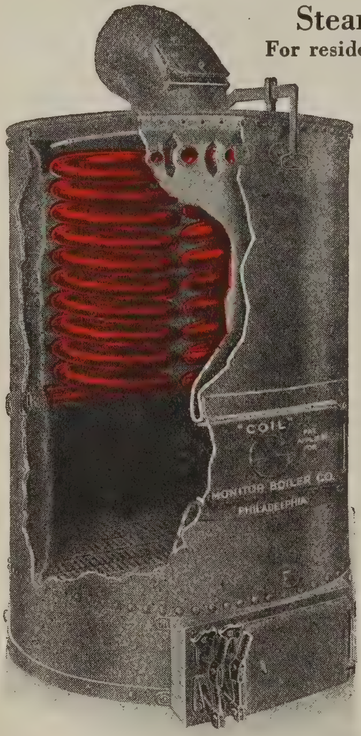

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Analysis of Oil Flames

By James L. Breese, Jr.*

THE efficient and successful operation of an oil burner, is dependent upon the manner in which the oil-burner installation is made. Most installations made by skilled installation-men, are, in their final analysis, set by eye. In other words, men with experience have found that certain settings of the burner give better results than others. There are some, a very few, who take the trouble to get a flue gas analysis after an installation has been made, and make the final adjustments, so that the flue gas analysis shows a relatively high percentage of CO_2 without showing smoke. It is probably not practical to insist on flue-gas analysis of every installation, and furthermore it is the writer's opinion that this is not necessary, provided the burner manufacturers study the subject and provide a burner so designed that the proper combustion will follow, within practical limits, when the setting of the burner is made according to simple directions.

Variables Effect Reaction

A flue-gas analysis is merely a measure of the result of a chemical reaction, but let us take a step behind the analysis, and find out what variables effect this chemical reaction. Let us suppose we have two chemicals, A and B, which we are using to produce a certain mixture, C, which mixture we find was satisfactory to our purpose, when the proportions of the two chemicals were such that the resultant mixture turned purple. We would note that if, when the mixture turned out red, we added a little more of B, we would get our purple. We would also find out that if we made the mixture in a cold room, it would take longer to produce the required results, or, if we heated the mixture, that the results would be obtained sooner and with less difficulty.

When we attempt to burn oil we have the problem of first converting the hydro-carbon liquid into a saturated vapor and then applying sufficient heat to bring it to a condition called gas. A good description of this transition period, and a standard definition of the difference between oil vapor and oil gas, is as follows: "When a substance in a gaseous condition is at, or near, the temperature at which it changes into a liquid, it is called a vapor, and when it is far removed from this temperature, it is called a gas."

---

*Breese Engineering Corp., Chicago. From a paper read before the Second Annual Convention of the American Association of Oil Burner Manufacturers.

With this gas produced, our next problem is mechanical. We must mix this gas with sufficient oxygen so that complete combustion can take place. So far our steps have been in the field of mechanics. We now jump into chemistry. As in the example of the purple liquid, we found that we had to raise the mixture to a certain temperature, in order to get a chemical reaction, so with our mixture of oil gas and air. We must raise this entire mixture to a point where a chemical reaction will take place between the hydrogen and oxygen, and the carbon and oxygen. The oil gas and oxygen having been mixed, and then brought to a certain temperature, chemical reaction will take place rapidly. Here we come to the critical point of combustion, which gives me the title of this paper, "Oil Flame Analysis."

If the steps above mentioned could be accomplished without the time element entering into the situation, oil flames would differ only in proportion to the percentage of oxygen to hydro-carbon present, but unfortunately we cannot dispense with the time element, and we therefore have many different types of flames, an analysis of which I hope will aid in the problem of making burners more practical, and more efficient.

> *"If we could make our oil burners burn as cleanly, and with as little noise as a gas stove, or a wood fire, we would indeed have reason to be proud of our products. In the final analysis there is no reason why we cannot do this, if we are willing to face the situation squarely and design mechanical means for giving us the results which nature provided with the log of wood. An appreciation of what occurs to produce different types of flame is the essential starting point."*

Did it ever occur to you why the flame from a log of wood gave off no smoke, and still did not have either the blue flame of the Bunsen burner, or the bright white flame which we get from a forced-draft burner? Wood is composed of carbon and hydrogen, and when heated in the presence of oxygen, burns to carbon dioxide and water, exactly the same as oil, but if we lit a pail of oil under similar conditions, we would obtain a dull red flame. I repeat, why the difference?

The answer is simple. An analysis of wood shows that an average of 40 per cent of the wood is oxygen. In other words, a log of wood is the original Bunsen burner. As the log is heated, and the fiber

(*Continued on page* 74)

The Important Three-Fourths in Successful Burner Operation

By R. P. Maynard*

IT has been said by Harry Maxon, the eminent authority on industrial fuel application, that only about 25 per cent of the successful operation of any oil burning equipment lies in the type or construction of the burner itself, the remaining 75 per cent being in the manner in which it is applied.

"ALTHOUGH he may not know it," writes Mr. Maynard, "the service or installation man is just as much a salesman as the fellow who received the order." And we believe he is frequently even more of a salesman. To him falls the duty of facing the owner when "something is wrong"; when ill-timed words and incautious moves may mean a customer lost. On his knowledge and skill depend every advantage claimed for the burner by the salesman. The increasing number of companies giving thorough courses of instruction to their service men indicates a growing realization of their importance.

This statement may be somewhat exaggerated for the sake of emphasis, for no matter how efficiently a primarily bad burner may be installed the results will be far from perfect. On the other hand, a fine burner poorly installed might still give service; but a good burner correctly installed will give something more than mere service, for it will render satisfaction, and there is a distinction between the words service and satisfaction.

The object of this little discussion is to bring out the importance of leaving the customer's job with some semblance of 100 per cent results, and to encourage the service or installation man with the assurance that his efforts are not entirely unnoticed.

Within any concern engaged in the oil-burner business, there exists,—exclusive of those matters executive or administrative, — four primary departments: manufacturing, accounting, sales, and service, the latter including, of course, installations.

The importance of the manufacturing and accounting branches is at once apparent, for their functions are more or less fixed, but the activities of the sales and service departments are often variable, or at least seasonable, and with attendant readjustments in personnel.

It seems an inherent fact that salesman and service man should never understand each other. The former thinks the man in overalls is simply a necessary evil, while the installation man invariably considers the salesman a parasite on the payroll, even though he may work on a commission basis. Actually, however, both are important cogs in the success of the organization, for after all their common goal is to see the company end the year minus red ink on the annual statement to stockholders.

---

*Wayne Tank and Pump Company

Although he may not know it, the service or installation man is just as much a salesman as the fellow who received the order. Perhaps you have entered the sales-room of some metropolitan oil-burner concern and have noted the large wall map bearing red or green or yellow tacks indicating installations. A closer inspection of this map will probably reveal the fact that these installations are in most cases grouped, and this frequently means that a burner properly installed at the residence of Mr. So and So three years ago is the reason for the other six tacks within a radius of one block.

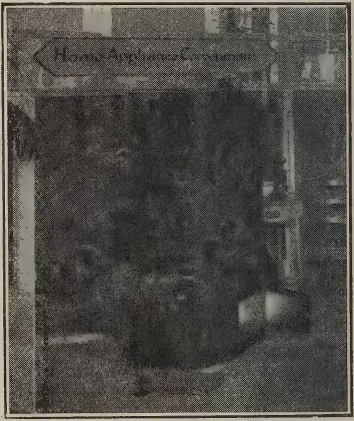
With these preliminaries, we now come to the whyfor of this article, and it is given in the form of confidential advice to the service man.

Remember that the installation is the last 75 per cent; that you have the power to make or break the results of the burner. Simply suppose that every installation you make is going into your own home. If, by virtue of past experience, you believe the burner is going to

(*Continued on page* 72)

Making Combination Burner and Incinerator

A combination oil burner boiler, hot water heater and garbage incinerator has been placed on the market by the Standard Steam Corporation, St. Louis, Mo. It is controlled by either steam or hot water pressure and can also be fired with hard coal without removing the oil burner, according to officials of the company. A thermostatically controlled gate valve in the main outlet heating pipe from the boiler to the rooms above, enables the burner to be operated for water heating or as an incinerator in warm weather, without heating the house above.



Combination oil burner boiler, hot water heater and garbage incinerator

Federal Gauge Expands

Two additional floors have been added to the Chicago plant of the Federal Gauge Company.

Some Reflections on Basic Engineering Experience in Oil Burning

By John P. Leask*

THE fundamental basic, engineering principles underlying all oil burning are the same—First, introduce the fuel into the furnace in a form which can be readily mixed with the air for combustion; second, admit the air to the furnace in proper amount and so directed as to completely burn the oil.

The form in which the oil is introduced varies over a wide range. Some types of burners use the oil in a pool, others atomize it by means of either air or steam; another type forms a spray by whirling the oil from the edge or orifices of a rotating member, while the mechanical atomizer breaks the oil into a spray by centrifugal force obtained by velocity. All of these methods have been used with more or less success. This classification, of course, does not include those burners which operate by first gasifying the oil, and this paper confines itself to those burners in which the oil is handled as a liquid.

It is of course self-evident that the rapidity of the combustion is in a large measure dependent upon the fineness of the atomization. It is also equally evident that it is easier to mix air properly with a finely divided spray than with one in which the oil is thrown in large drops. All burners which atomize the oil, and this includes the large majority of oil burners, do this by means of the application of power — the compressed air or steam atomizer utilizes the energy liberated by the expansion of either medium; the burner with the rotating member consumes either electricity or water to produce this rotation, while the mechanical burner requires energy to produce the rapid whirling of the oil itself which breaks it into a spray.

Atomization Costs

All these forms of energy cost money. Considered as an atomizer, the burner which will divide a pound of oil into the finest spray for the least expense will be the most economical. This is clearly demonstrated in the story of the compressed air atomizer. At one time compressed air was used to a large extent as an atomizing medium. The high cost of compressed air as compared with steam, the fixed charges on the air compressing plant required, soon made it apparent that steam was far the cheaper of the two, and as a consequence, compressed air is rarely used today. It has a certain limited field, however, in locations where oil is burned at considerable distances from the boiler plant, in which case the condensation losses in the steam lines may become excessive. The cheapest burners to operate are those of the mechanical class in which no power is used other than that imparted to the oil through pressure.

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*Peabody Engineering Corporation, New York City.

From a paper read before the Second Annual Convention of the American Association of Oil Burner Manufacturers.

Air Important

The proper admission of air is of as great importance as the fineness of the spray and perhaps more difficult to obtain. Theoretically, just sufficient air should be admitted to burn all the oil completely. As a matter of practice, this theoretical amount must necessarily be exceeded. The amount of excess air should not exceed that theoretically required by more than 20 per cent in a first class oil burner. That burner which burns all the oil required for maximum capacity with no smoke and no carbon monoxide in the flue gas and with the least amount of excess air is the most efficient burner.

The air for combustion is admitted to the furnace in a variety of ways. Most burners of the steam atomizer class admit the air for combustion through checker brick openings in the floor of the furnace. Mechanical burners admit the air required for combustion through an air register around the atomizer. This practice is followed by most of the automatic domestic burners, some of which supply all the air required for combustion under positive pressure, by means of a fan; while others admit part of the air in this manner and introduce the balance through natural draft openings. All of these methods have been successfully worked out.

One of the chief sources of loss of economy in a well designed oil burner is high excess air. I don't believe there is very much loss of economy in actual practice due to insufficient air. Insufficient air will produce smoke and smoke is so readily seen that it is as a general rule eliminated at once. On the excess air side there is no such obvious warning. From the point where sufficient air is introduced up to an excess air of most anything you please, the furnace and stack will be clear, and what may seem to be excellent combustion will produce most uneconomical results. For this reason the products of combustion should always be analyzed so that some check may be had on the amount of air being introduced.

It must also be borne in mind that the burners must be so arranged in the furnace that all the oil is gasified before it has a chance to strike a relatively cool surface. Hot brick work is relatively cool. I have seen carbon built up on furnace walls which were incandescent. It is much simpler to make a proper furnace arrangement if proper atomization and proper air admixture have been taken care of.

The success or failure of all oil burners depends almost entirely on these two factors. Where oil is burned for power, the question of economy was forced on the manufacturers of oil burners at almost

(*Continued on page* 62)

Heating Problems and Oil Burning

By Homer R. Linn*

THE oil burner industry has met with a great many drawbacks which were not due to inherent defects of the burners. It has also had a number of setbacks due to development processes which really are chargeable to the burner. The result is that the summation of these two series of defects have had a good deal to do with limiting the number of burners installed. In the end they may have been blessings in disguise, inasmuch as the development of any sound industry has always been fraught with a great deal of experimental work and discouraging experiences.

> *"VERY often an oil burner prospect originates from a heating trouble which cannot be corrected by the installation of an oil burner. For instance, the oil burner in itself cannot correct piping systems, overcome the difficulty of uncovered mains, increase the amount of radiation in a room, etc., but that is no reason why, if the prospect has originated from such an experience, that the oil burner salesman cannot develop it into a successful installation, and that is what my plea is for: more rigid engineering and inspection before installation as well as after, so as to insure the most economical and successful operation possible."*

It really seems that the domestic oil burner has arrived at a higher state of perfection in a shorter space of time than almost any other industry in the last century, save possibly the radio. I am inclined to think that this is particularly due to the fact that it has been allied to heating and ventilating, which is one of the highly developed sciences of the present age. In other words, the oil burner industry has been able to take advantage of and benefit itself by the experiences of the heating profession in general.

It does seem to me that the one outstanding shortcoming of the industry today is probably due more than anything else to the fact that too many details of design, construction and installation are handled without enough engineering knowledge. I do not wish to disparage nor belittle those connected with the oil burner industry who have made such wonderful progress with it, but I wish it were possible for the good of oil burning in general, that the sales departments of oil burner companies, especially the distributing agents, should be under the jurisdiction of thoroughly trained heating engineers.

I know of several oil burner

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*President, Illinois Chapter of A. S. H. & V. E. From a paper read before the Second Annual Convention of the American Association of Oil Burner Manufacturers.

companies who maintain engineering departments that are supervised and conducted by thoroughly trained and efficient heating engineers, whose duty it is to pass on every installation before the sale can become a binding contract between the oil burner company and the user. This at once eliminates a great many trouble calls, which otherwise would become very irritating, and in the end have the effect of slowing up sales.

Engineering Necessary

At a joint meeting of the heating engineers, oil burner manufacturers and heating contractors, held in Chicago at the Engineers' Clubroom, Monday, March 9th, to discuss oil burning in its various phases and problems, the main point brought out was the fact that, aside from control troubles, a great many of the oil burner troubles could be eliminated by better engineering on the part of the oil burner distributors and installation departments.

One heating contractor went so far as to say that all of the troubles he had experienced, where oil burners had been installed in connection with his work, could have been eliminated by the services of a heating engineer to check over the layout before the installation was made.

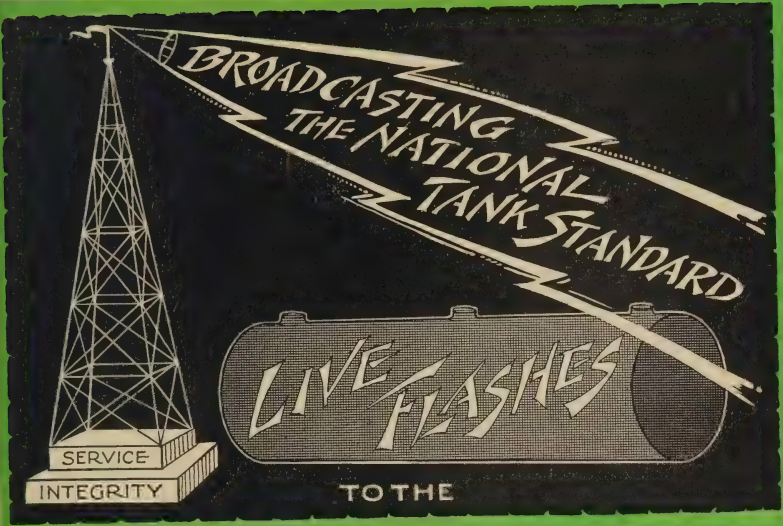
Another noticeable fact was that all those taking part in the discussion, whether they had experienced oil burner troubles or not, almost invariably added this remark: That they were aware *oil burning had come to stay* and all that was needed now was to have a better grade of engineering service in connection with design, installation and operation.

It does not seem to me that we place enough significance on the Underwriters' approval of oil burners. There is a movement on foot in the National Association of Real Estate Boards to issue a "Pocket Guide to Good Construction" which would set forth the principles of construction recommended by that association. This eventually will, in all probability, lead to classifying buildings according to their construction and equipment as Class "A," Class "B," Class "C," etc. Their recommendations will take into account, heating, lighting, plumbing, as well as the actual methods of framing, insulating, painting, etc. I might add that these Boards have very high regard for the materials approved by the Underwriters.

The petroleum industry does not yet seem to feel that the grade or specification of furnace oil is a settled factor in the petroleum industry. It seems to me after reading a great many papers on this subject and hearing much discussion at the oil men's conventions, that the specifications for furnace oil will not be settled until it is settled by a joint committee of oil burner manufacturers working in conjunction with the American Petroleum Institute.

Very often an oil burner prospect originates from a heating trouble which cannot be corrected by the installation of an oil burner. For instance, the oil burner in itself cannot correct piping systems, over-

(*Continued on page* 54)



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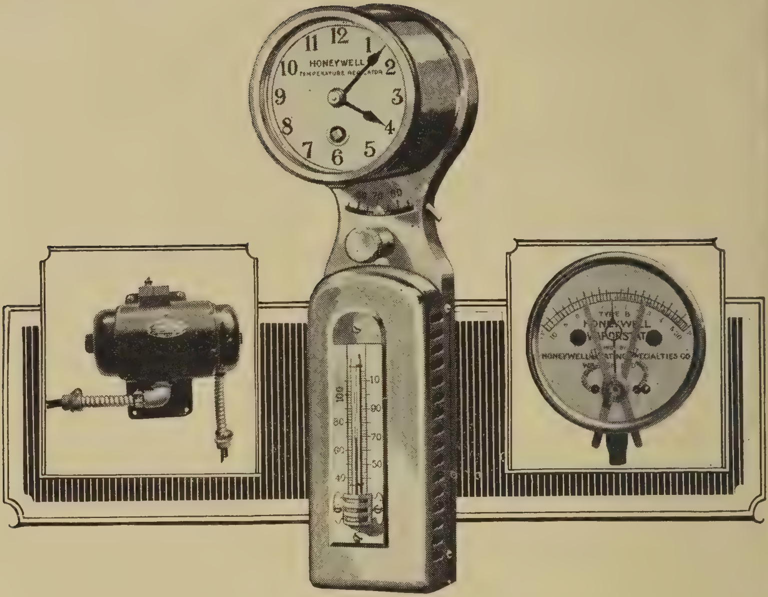

It is gratifying that the leaders in the oil burning industry continue year after year to specify Honeywell quality controls.

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Annealing Process Requires a Dependable Fuel

Oil Has Come Rapidly to the Front for Use in This Important Foundry Practice

ONE of the important processes in the manufacture of malleable castings in which fuel oil has come to play an important part during the last few years is annealing. This process is one in which the heat must be maintained the same in all portions of the oven at the same time.

CASTINGS are annealed to soften them for machining and to remove all stress due to rolling or hammering. The temperature required is slightly above the critical point, which varies according to the character of the metal, and should be maintained so as to heat the entire load of castings evenly during its journey through the oven, with absolutely no departure from the correct temperature. The requirements imposed on the fuel used are rigid and severe, hence the wide adoption of fuel oil.

The Saginaw Malleable Iron Company, Saginaw, Mich., which manufactures castings for Buick, Chevrolet and other divisions of General Motors, uses for its annealing a continuous muffle type oven, or furnace. A muffle furnace is one in which the flame itself does not come in contact with the body that is being heated, the latter being enclosed in a chamber or container known as a "muffle."

In the Saginaw Company's oven there are 12 regular burners and 6 auxiliary burners divided between two combustion chambers—one on each side of the oven. The oil used is a heavy gas distillate. Atomization is obtained by the use of nozzles of the air jet type, the air being preheated to 550 deg. F.

The castings are packed in annealing pots and loaded on cars that run on an industrial track, passing through the oven and returning on the outside. Each car carries approximately 4⅓ tons of castings.

In order to aid the firemen in controlling the furnace temperature and oil flow, two Brown CO_2 recorders are attached to the oven. Two tubes take off samples of the gas from each combustion chamber just before it enters the stack. For each tube there is a gas cooler, filter and cell all located at a convenient point near the office where the CO_2 reading for each combustion chamber is shown and recorded on a chart.

Each morning the indicators in the panel instrument are checked for zero reading. If any adjustment is necessary it can easily be made by changing the resistance in the gas cells. The oven is in continuous operation and, since the charts are also continuous, and not changed every 24 hours, they furnish an uninterrupted record of the efficiency of combustion for both chambers.

Before the installation of the CO_2 recorder, it was difficult to obtain a high combustion efficiency due to the lack of instruments to show the results being obtained and to the natural tendency to regulate temperatures in the oven by changing the rate of flow of oil alone. Of course, when a higher temperature is desired and more oil is admitted to the burners, the air for vaporizing should be increased also. However, it is difficult to know just how much more air should be supplied.

Eliminate Trouble

With the CO_2 recorders, this difficulty was eliminated and the proper relation of flow of air and oil can be maintained exactly. Thus an excess of air which cools the oven or a deficiency of air which wastes the oil, is avoided with a consequent saving in oil under both conditions.

Of course, the oil consumption varies with the amount of castings to be annealed but, under present average conditions over a 24-hr. period, when 11 cars of castings are annealed, about 1,200 gallons of oil are required. This was determined during a survey made of the plant recently by the A. C. Nielsen Company.

Since the connection between the gas cells and the recording instrument is made by electricity, it was possible to conveniently locate the instrument in the fireman's office. There, any plugging up of the burners or other trouble in the combustion chambers is immediately shown on the charts. This enables the fireman to make any required corrections in operation as soon as they occur, whereas they might otherwise be delayed and the high quality of our castings impaired.

Describe a Gas Fired Incinerator

Disposal of garbage by burning in a gas fired incinerator, designed for installation in the home, is described in a folder sent out by the Home Incinerator Company, Milwaukee, Wis. According to the folder, it should be operated two or three times weekly, for a short period each time. Its shape is that of a vertical cylinder, with a diameter of two feet and height about that of the average stove. The interior is funnel shaped, with the gas burner at the bottom.

A program to help dealer sales has been instituted by the company. It includes distribution of material for local advertising and direct mail helps. It is hoped that the sale of incinerators may ease the slack season when oil burner sales are not so heavy.

Pump for Oil Fired Boilers

Northern Pump Company of Minneapolis, in a recent catalog, describes its rotary pump designed for use in fuel oil burners under steam boilers. A feature of the pump is the strainer which is located in the suction base of the pump. Cleaning is thus possible without disturbing the suction pipeline.

Annual banquet of the A.A.O.B.M. Held in the main ball room of the Edgewater Beach Hotel, Chicago, April 2.

Chicago Meeting A. A. O. B. M. a Noteworthy One

THREE noteworthy achievements belong to the Second Annual Meeting of the American Association of Oil Burner Manufacturers, held at the Edgewater Beach Hotel, Chicago, April 1, 2 and 3. First, the uniformly high character of the papers and discussions at the general meetings, and the attention and interest these papers stimulated. Second, the progress in the science of oil burning during the current year, which was demonstrated not only in the papers, but even more graphically in the exhibit of burners and auxiliary burning equipment. Third, the employing by the Association of a Technologist, Colonel J. T. B. Bowles, to lay out and execute a broad program of technical improvement in the use of oil fuels, and to assist individual members with their technical problems.

C. H. Chalmers, president of the Chalmers Oil Burner Company, Minneapolis, Minn., and newly elected president of the A.A.O.B.M.

There was reassurance in full measure to those who have been skeptical concerning the soundness of the oil burner industry, and the progress of its Association, in the attendance of more than six hundred burner manufacturers and distributors who came from every corner of the United States and even from Canada to take part in the program of this meeting. The year's work of the Association through its members and its committees was given in the reports of committee chairmen, and in other papers delivered during the convention, at both the general sessions and the business meeting. On every hand words of praise for the progress of the industry and its Association during the past year were heard. The reports of the more active committees presented during the convention will be sent to all members and will be published in FUEL OIL, in this and subsequent issues. Since these papers will be printed in full, briefs of them will not be included in this article. From the program, which was published in full in the April issue, it will be seen that these papers deal with every fundamental problem in the manufacture, sale and maintenance of oil burning equipment. By action of the Board of Directors papers presented at the meeting will be available only to members and associate members.

"I thought the oil burner Association might grow to these proportions during the next five years. If you make such progress in the years to come it will be difficult to anticipate what the results will be," said E. J. Smith, chief of the Oils Division of the Underwriters' Laboratories, Chicago, by way of introduction to his address on "Installation Standards."

Edward P. Bailey, retiring president, in his opening address, "The Old Year and the New," recited the aims and work of the Association, and told of the practical achievements of the Association, especially in its work of revising the standards of the Underwriters' Laboratories and with the Flammable Liquids Committee of the National Fire Protection Association, and with the American Petroleum Institute. Mr. Bailey emphasized the feeling of good fellowship, with the consequent improvement in competitive rivalry and sales methods that had been engendered since the organization of the Association.

Entertainment Given

On the opening night of the meeting an entertainment was given to all those attending in which Chicago members of the industry, and some out of town friends of the industry acted as hosts. Vaudeville acts and musicales were followed by dancing and a buffet luncheon. Ladies accompanying those attending the convention were entertained daily with theater parties, luncheons, bridge parties or drives about Chicago. The annual banquet of the Association was held the evening of the second day. President Bailey acted as toastmaster and introduced Dr. Edward J. Cattel of Philadelphia, who is eighty-five years of age, and who gave an address which combined high optimism for the future of this country with analytical facts concerning its progress during his lifetime. The address will be long remembered by his audience. L. B. Ward of Detroit, also spoke briefly.

At the business meeting officers and directors were elected for the

(*Continued on page* 28)

Report of Committee on Underwriters Standards

American Association of Oil Burner Manufacturers

By J. H. Hirsch

IT is with regret that your Committee on Underwriters Regulations is unable to give you a report as concise and complete as the needs of your members demand. As is the case with all pioneering, much investigation and experimentation must be done before we can fairly claim to have our feet firmly on solid ground.

Only Tentative

Automatically controlled oil burning devices are in existence for such comparatively short time and so many methods have been devised that it has been impossible to get beyond a tentative set of Regulations which have for the most part been based on practices in related devices rather than on the devices themselves.

The first set of Regulations proposed by the Underwriters was submitted to the individual members of our Association, each of whom was requested to communicate to your committee their suggestions for modification and elaboration. These suggestions were carefully discussed by your committee, followed by a very exhaustive consideration by your committee in collaboration with the Underwriters Engineers. As a result a revised set of proposed rules was submitted by the laboratories a few weeks ago. A copy was sent to each of your members but unfortunately only ten saw fit to offer any comment or even an acknowledgment. The receipt of such replies as were sent was so recent that it was impossible to call a meeting of the committee until today, March 31. Your chairman, however, took upon himself the responsibility of a meeting with the engineers of the laboratory during the past week. Some changes were made which will necessitate a further revision and another reference to your membership.

Experience Lacking

Owing to the lack of experience in the industry as a whole, a great many practices have crept in which will be eliminated as the individual manufacturer and dealer becomes more familiar with the needs of business. Unfortunately each manufacturer has considered these regulations from his own point of view rather than from the broad scope of the entire trade. This has resulted in some dissatisfaction, which your committee and the Underwriters Laboratory are striving to change, to meet the situation as a whole. The Underwriters on the other hand have been compelled to propose rules based on their experience of hazard in other fields. They have been most sincere in their efforts to adopt a standard of minimum requirements, thereby subjecting each manufacturer to as little trouble and expense of change as possible consistent with safety from fire hazard. The latest proposals are so close to a possible minimum of requirement that those manufacturers who offered comment confine their remarks for the most part to request for elucidation rather than change.

Operations Best Test

Your committee is of the opinion that no set of rules can be promulgated which will cover every possible combination of devices. A practice entirely safe in connection in one burner may be extremely hazardous in another. For that reason it is very probable that a manufacturer may conform to the Underwriters Regulations in every respect and still produce a machine too hazardous for general use—the real test must be actual operation under possible service conditions.

The practice of some manufacturers claiming the approval of Underwriters Laboratories is unwarranted. Our membership should understand that that organization does not go beyond recommendation of safety from fire hazard and their province is limited to listing as non-hazardous rather than approval as a mechanical device.

The future of the oil burning industry lies in the hands of those engaged in the manufacture and sales of such devices. Listing by the laboratories is only a small part of our obligation to the public—we are in the position of the school boy who looks upon the teacher as his natural enemy instead of one trying to equip him for a life of usefulness and happiness. The laboratory is trying to point the way for safety and we, as manufacturers, for our own successful future must use every effort to safeguard lives and property.

To this end, we express the hope that every manufacturer will consider himself an advisor to the committee and submit in writing all suggestions which in his opinion will tend to better the product of every one of us, and further will, in every possible way, make his own machine with "Safety First" as his slogan.

Your committee recommends the present method of conference with the Underwriters Laboratories, with a reference to all their proposed regulations to our full membership for discussion until such time as all points are properly safeguarded without injustice to any manufacturer.

Oil-O-Matic Dealers' Banquet

Dealers in Oil-O-Matic burners held an enjoyable banquet recently at the Auditorium Hotel in Chicago. Homer Buckley was the principal speaker. Others who spoke were L. H. Van Ness, W. W. Williams, C. W. Williams, and S. O. Andros. Much enthusiasm was shown by the 100 persons present in the prospects for the new unit. Features of the unit are elimination of service complaints and the automatic device which eliminates stack control.

Fuel Oil Markets

Demand Slackening—Conditions Point to Lower Prices

DECLINE of domestic heating fuel requirements with warmer weather predominating during April had little effect on the fuel oil market and it surprised observers by maintaining a strong tone until late in the month. The industrial demand, with some late buying by railroads, attracted back into the market by lower prices, continued to hold up better than expected. On the other hand, an oversupply of low grade oil, principally from Smackover, Ark., which supplies much of the Mid-Continent's crude fuel requirements, weakened the market toward the latter stages of the month and brought slightly lower prices.

From the refiner's standpoint, the tendency of the market to hold its prices above a dollar in view of earlier predictions that dollar fuel or less was in order, was surprising. An increasing supply, rather than any lessened demand, caused the weakened condition. Even at its present figure, the market is admittedly stronger than would normally be expected at this time of year.

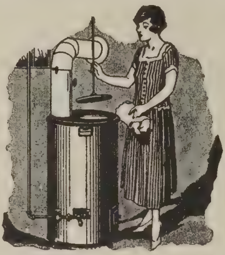
Efforts of oil burner manufacturers and the industry in general to counteract the return-to-coal movement sponsored in parts of the Middle West, met with some success, at least there is a shift back into the market from former coal using concerns. Some railroad buyers, learning that prices were off from previous levels, headed this movement.

While the fuel market showed resistance to efforts of some interests to bring prices down quickly, it is learned that refiners are willing to make contracts on a reasonable basis at satisfactory prices and the renewed industrial buying was made largely on this basis.

See Lower Prices

Looking into the future, many fuel oil men see a good thing in lower prices at this time. They point out that the coal users, or those intending to use coal, are now inclined to come back into the fuel oil market now that prices are lower, while some new business will be developed from those who have not used fuel before. Consequently, the large amount of low gravity oil and fuel oil supply may be something of a blessing after all. Many consumers in the Southwestern and Middlewestern regions have intimated that they would increase their orders on cheaper fuel and, with prices expected to decline with the seasonal demand, much new business looms

A Profitable Follow-Up for Spring Clean-Up



Spring is the clean-up season. But why confine it to spring? Oil burner users especially want clean homes and yards 365 days in the year. Sell them the Home Incinerator by showing them how it eliminates the unsightly rubbish barrel and filthy garbage can.

The Home Incinerator is a real achievement. Consumes garbage and rubbish completetly, without smoke or odor. Dependable, economical in operation. Positively needs no servicing. A clear profit on every sale. Large top opening. Push-bottom lighter. Easily installed in any basement. Portable type.

Make big profits now. Follow up Spring Clean-up with Home Incinerator sales.

Home Incinerator Co.
Milwaukee, Wisconsin

Write Today for Prices and Specifications

The Home IncineratoR

in sight. It is possible that prices will go below the dollar level as a stimulus for this business.

It is noted in the Southwest and parts of the Middle West, that some of the largest fuel oil consumers who partly returned to coal, are preparing to take on fuel again. Many of these are public utilities. Some are going ahead with plans for putting their plants on a fuel oil burning basis entirely. Much of the "switching" that has been done appears to have been done for effect only, and while it got the desired effect, most of them recognize the convenience and efficiency of oil burning.

Gulf Coast fuels are practically unchanged at $1.65 as compared with $1.70 a month ago. Arkansas fuel classed as 22-26 refinery grade is quoted at $1.05 to $1.10 a barrel. The situation at Smackover has proved to be the pivot point in the Mid-Continent market with an immense output of new crude from the deep sands.

Prices, tank car lots, f.o.b. Group 3 refineries, on April 18, were quoted as follows:

Fuel Oil	24-26....	$1.05	$1.07	(Bbl.)
Fuel Oil	26.28....	1.08	1.10	"
Gas Oil	32-36....	.03	.03⅛	(Gal.)
Distillate	36-38....	.03⅛	.03⅜	"
Distillate	38-40....	.03¼	.03½	"
Kerosene	41-42....	.04	.04¼	"
Kerosene	42-44....	.04¼	.04½	"

Hardinge Changes Address

The Hardinge Fuel Oil Heating Company has moved into new quarters at 1720 South Michigan Avenue, Chicago. Headquarters were formerly at 23 E. Congress Street.

Reflex Turbine

A New Engineering Principle

The new REFLEX burner is operated on a new engineering principle of unusual design. The most vital part of this burner, the nozzle, is operated by a high speed turbine, pneumatically driven, which rotates the nozzle at a speed of 17,500 revolutions per minute and develops remarkable power. The turbine in the burner is operated by a low pressure blower of small size. The Reflex is not suitable for household installations, but is for hotels, apartments and similar sized buildings.

Desirable dealer franchises open. Write for details

SIMPLEX OIL HEATING COMPANY
87 BROADWAY PROVIDENCE, R. I.

CHICAGO MEETING OF A. A. O. B. M.

(*Continued from page* 22)

year. C. H. Chalmers, of the Chalmers Oil Burner Company, Minneapolis, Minn., was elected president. Mr. Chalmers, born in Canada, moved to Minnesota during his early boyhood and attended the public schools there, graduating from the University of Minnesota in 1894. He holds two degrees from the University of Minnesota, incuding one in Electrical Engineering. For thirteen years he was general manager of the Electric Machinery Company of Minneapolis, following which he did consulting engineering work.

During the war Mr. Chalmers served with the U. S. Treasury Department in war savings work. In 1920 he began the design, development and manufacture of the Chalmers Oil Burner. He was recently elected to membership in the American Society of Heating and Ventilating Engineers.

Association Officers

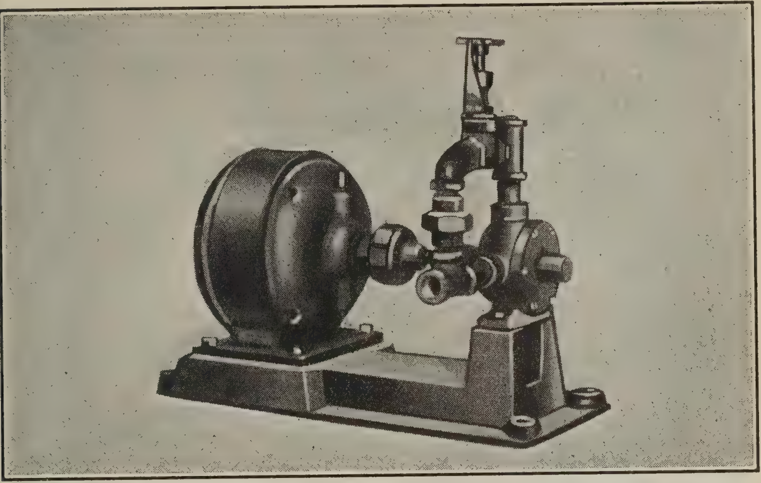
Other officers chosen were: Vice-presidents—John P. Leask, Peabody Engineering Corp., New York City; Lionel L. Jacobs, Fess Oil Burners of Canada, Ltd., Toronto, Ont., Canada; E. J. Smith, Gill Mfg. Company, Chicago, Ill.; Wallace C. Capen, Home Appliance Corp., St. Louis, Mo., and J. L. Voorheis, Coen Company, San Francisco, Cal.

Directors: Edward P. Bailey, National Airoil Burner Company, Philadelphia, Pa.; H. A. Tiffany, Tiffany Oil Burner Co., Newark, N. J.; J. C. Johnson, S. T. Johnson

OHIO MOTORS

The Ohio Sleeve Type Bearing is so designed that every drop of oil in the bearing is fully utilized. **Not a drop of oil escapes from the bearing.** This fact has made possible such performance records as 5,000 hours continuous service at 50% overload without further oiling.

THE OHIO ELECTRIC AND CONTROLLER COMPANY
5920 Maurice Avenue Cleveland, Ohio
Member of American Association of Oil Burner Manufacturers.



A New Fuel Oil Pump by Blackmer

To provide a good rotary pump, especially suited to domestic and industrial fuel oil use, the Blackmer Rotary Pump Company, makers of rotaries for twenty years, developed the Model 13.

It embodies the well known Blackmer Principle of automatic-take-up-for-wear, and has the added advantage of accurate needle-valve control of flow, regardless of change of motor speed.

BLACKMER

Model 13 Fuel Oil Pump

Is direct connected through a pressed steel, flexible coupling to a ⅛ H.P. Emerson Motor. Capacity is up to 3 G.P.M. Equipped when desired with by-pass with needle-valve control, insuring uniform delivery of fuel. It is a compact unit, occupying floor space 16½ inches by 7½ inches.

Our engineers will gladly consult with you on any pumping problem. Write for detailed literature about Model 13.

BLACKMER ROTARY PUMP Co.
Petoskey, Mich.

Branches in nineteen principal cities

MECHANICAL DEVICES COMPANY

Flexible Hand Operated Motor Driven Pumping Units

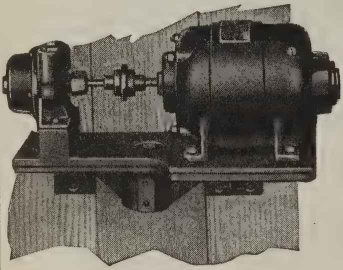


Figure No. 464

Figure No. 464 shows M-D-Co. Five Gallon Per Minue ½" pump direct connected to electric motor by means of a flexible coupling.

Pump mounted in unit with motor on cast iron combination bed plate giving a serviceable flexible unit for mounting to wall by the use of the provision of Wall Bracket or by inserting piece of 1¼" I. P. and use of Floor Flange, ideal pedestal arrangement is had. Can be operated by hand operated switch or automatically operated by Mercury Float Switch.

Write for particulars

Mechanical Devices Co.
Main Office and Factory:
Aurora. Illinois

Company, Oakland, Cal.; George P. Kittle, Aeroil Burner Company, Union Hill, N. J., and J. L. L. McCormack, Hardinge Brothers, Chicago, Ill.

Executive Committee: C. H. Chalmers, president; Edward P. Bailey, retiring president; Leod D. Becker, executive secretary.

Reports Read

At the business meeting a report from Geo. P. Kittle, chairman of the Committee on New Members and the report of the Executive Secretary, outlining a program of work for the next five years, were read. Mr. Kittle's report recommended to the Board of Directors that the secretary be empowered to establish a library of oil burning books, literature, and data at Association headquarters for the use of members. The secretary's report recommended that the compilation of monthly statistics covering production, sales, and stocks, of oil burners be undertaken by the Association or through the Bureau of Census at Washington; that a cooperative advertising campaign be undertaken for the purpose of telling of the superiority of oil burning in industry and households; and the declaration of an armistice on patent litigations through a cross licensing agreement, such as has been successfully used by the manufacturers of automobiles. A handsome gold watch was given to the executive secretary in appreciation of his work.

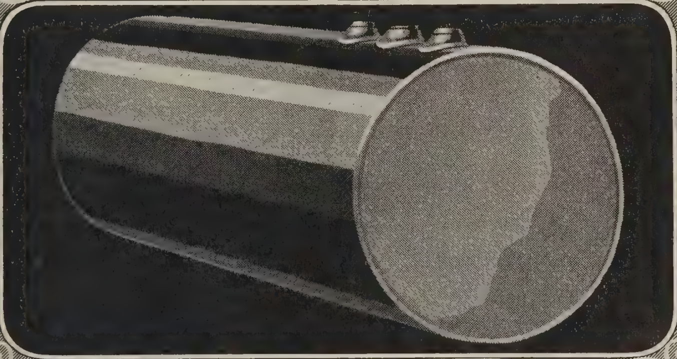
Colonel J. T-B. Bowles, chosen as technologist for the Association, has for five years acted as chief technologist for the Tidewater Oil Company, New York, and is a member

BURY IT — AND FORGET IT!

That's the kind of furnace oil storage tank you want — one that you can bury and forget. There are so many other things to occupy your mind that you can't afford to risk the use of an untested, unknown tank and then spend time worrying whether or not it will give satisfactory service. Use a Gilbert & Barker welded and tested tank in your next burner installation. You'll find it pays in better service, no worry and less burner trouble.

Sizes 285 to 2000 gallons capacity. Write for prices.

GILBERT AND BARKER
MANUFACTURING COMPANY
GASOLINE AND OIL STORAGE EQUIPMENT
SPRINGFIELD, MASS.



Tite flex
REG. U. S. PAT. OFF.

Titeflex All Metal Tubing for Oil Burner Equipment

It Is Flexible

It Absorbs Vibration

It Has No Packed
Sliding Joints.

It Is All Metal

It Is Safe.

THE TITEFLEX METAL HOSE CO.
NEWARK, N. J.

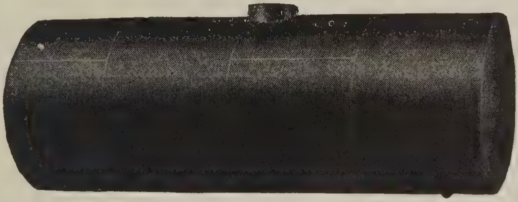
of many of the important scientific societies of this country and England. He is also a member of many important committees of these societies, especially those concerned with oils. Men familiar with Colonel Bowles' work and attainments count the Association most fortunate in its choice of the head of its technical department. After a survey of the needs of the industry and the resources of the Association, Colonel Bowles will lay out a program of technical development and research for the Association, as well as serve as technical advisor to members and to representatives of the organization who serve on various committees.

Provision was made to change the name of the Association to the American Oil Burner Association, and to provide for a Dealer Division as soon as the amendment to the constitution can be regularly made. The Board of Directors will hold its quarterly meeting the second Tuesday in July, at which time it is expected the meeting place for next year's convention will be chosen.

Shore Corporation Issues a New Circular

In a circular issued by The Shore Heating Corporation a description is given of their burner which, it is claimed, is designed to burn any grade of oil, that the oil will flow. A special grade of refractory material is used in the construction of the burner on account of the high temperature of combustion, according to the circular.

Buy Now—
and Smile Later



Butler-Built Tanks

Have two great qualities—*Durability and Tightness*—which enable the owner to smile with satisfaction as his tank meets every test. Our thorough building methods make Butler tanks easier to install, and give them a longer life. *Results* prove this.

Made of black or galvanized steel, 10, 12 or 14 gage, and in eight sizes, from 550 to 3155 gallon capacities, giving a wide range to choose from.

***Write today* and tell us your tank problem. We will be glad to give you advice and quote you attractive prices on Butler-Built Tanks.**

Ask for our booklet on "Fuel Oil Tanks for Oil Burning Equipment!" It is very complete, therefore valuable.

Two conveniently located factories enable us to give you most prompt and efficient service on tank deliveries.

Butler Manufacturing Company

Kansas City, Mo. **Minneapolis, Minn.**

Oil Heaters Being Installed in Submarines

Oil heaters are being installed in the United States Navy's latest type of submarines, according to D. B. Roberts, of the Super Oil Heator Company, Hartford, Conn. A number of Super Oil Heators have been installed, he says, and are used for heating purposes and in the operation of the evaporating plants with which the vessels are equipped.

Besides serving this double purpose, the heaters have another advantage in that they burn the same grade of oil that is consumed by the Diesel engines which propel the submarines, thereby eliminating excessive storage facilities.

These new type vessels are of 2500 tons displacement, speed 21 knots, 7000 horse power, are 340 feet long and have a surface speed of approximately 30 knots an hour. They carry crews of 60 men each and are entirely self sustaining, having all modern electrical equipment, such as telephones, wireless, etc.

According to Mr. Roberts, the Super Heator Company has launched a large building program for the summer of 1925, to take care of the increased demands.

Leiman Brothers Send Out Catalog

Air pumps, oil pumps, and accessories are the subjects covered in the latest catalog of Leiman Brothers of New York. The company also markets an automatic fuel oil storage tank.

AUTOMATIC OIL BURNER
Nu-way
FOR HOME HEATING

A Dependable Burner With Low Service Cost

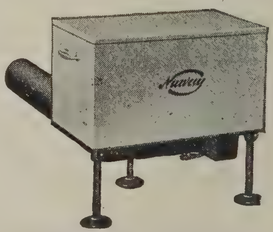
Nu-Way is a dependable burner with low service cost. Dealers who have seen profits from oil burner sales dissipated in service costs will be especially interested in the Nu-Way Automatic Oil Burner.

Simple—Dependable
Inexpensive to Service

Service records taken from more than two hundred Nu-Way installations show the low operating and service costs for Nu-Way Burners over a period of two years.

Write for Nu-Way service records and our booklet "Home Heating Supremacy."

DOOLEY & BRADEN
4505 Sixth Ave.
Rock Island, Illinois



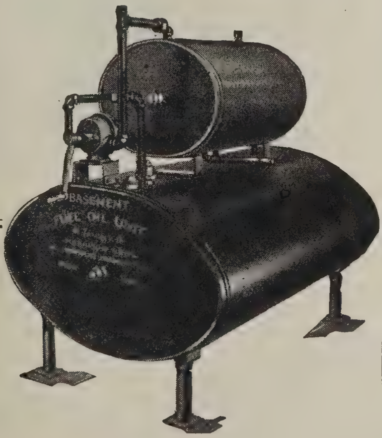
Nu-Way has proven profitable to every dealer who has handled it. It will make money for YOU.

This Fuel Oil Tank is a Wonder

Investigation will reveal your need of the improved Morrison fuel oil tank assembly. Goes right into the basement. The 250-gal. supply tank is oval shaped to go through the basement door. Above is a 50-gal. auxiliary tank and hand piston pump for filling it. Complete with overflow pipe and measuring gauges.

High grade, 14-gauge, black steel and best workmanship make these tanks durable, trustworthy and leak-proof. Write for literature.

Morrison Bros.
"OIL EQUIPMENT HEADQUARTERS"
Dubuque, Iowa



The Morrison Oval Fuel Oil tank assembly enables you to make a double saving. First, the cost is low. Second, it saves excavating and cutting through basement walls.

Price Complete	**$120**
Magnetic Gauge	**5**
Pumps	**16**

ELECTRIC
WELDED

STEEL TANKS

**Largest stock in
Metropolitan District
Quick Deliveries
At Competitive Prices**

EARL C. MAXWELL CO.
93—123 13TH ST.
BROOKLYN, N.Y.

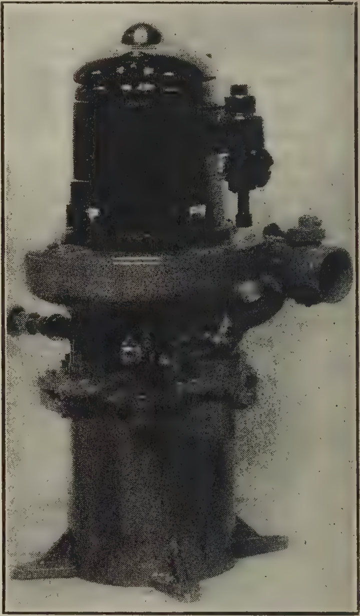
Distributors
Wanted

Oil Burner Manufacturer marketing a burner of proven efficiency in use from Maine to California wants able and conscientious distributor in all open territories. This is a rare opportunity for energetic men.

**Needham Oil Burner Co.
337 W. Madison St.
CHICAGO**

Wayne Introduces New Oil Burner

Wayne Tank and Pump Company, of Fort Wayne, Ind., has placed on the market a new domestic oil burner, to be known as the Wayne. It is made in three sizes, to make the range of adaptation to heating requirements as wide as possible. From the illustration it is apparent that the various moving operating units are attached to a vertical shaft revolved by an electric motor. Control is automatic. Forced draft is employed, the fan being direct connected to the motor.



Wayne Tank and Pump Company's New Oil Burner

Fuel Oil Production Up in February

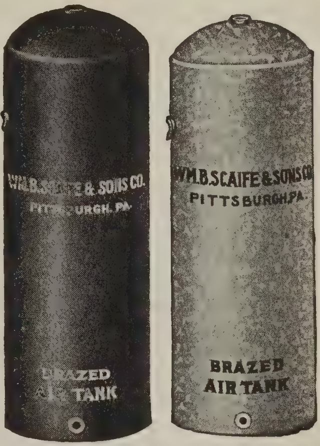
Fuel and gas oils produced in the United States during February totaled 1,059,000,000 compared with 1,171,402,042 gallons during January and 1,025,421,651 gallons during February of 1924. The daily average production during February was 37,800,000 gallons, compared with 35,350,000 gallons during February of 1924.

Stocks on hand at refineries on March 1 amounted to 1,639,105,022 gallons, compared with stocks of 1,619,688,131 gallons on February 1. March 1, 1924, the stocks were but 1,491,173,016 gallons. Domestic demand fell off considerably during February and the total consumption was but 989,404,932 gallons, a decrease of 175,000,000 gallons from the January total, but 37,000,000 gallons more than the total for February of 1924.

The rise in the price of crude oil brought renewed drilling activities in all fields with the result that production increased in Texas, Oklahoma, Arkansas and California during the last two months. This, of course, will add greatly to the stocks on hand, inasmuch as the domestic demand, due to the advent of warmer weather, has decreased steadily since February 1. The American Petroleum Institute reports an increase in stocks of 31,148,418 gallons during March. The program for the summer, from present appearances, includes only a steady increase in stocks and a corresponding decrease in consumption. Heavy fuel oil stocks will increase much faster than the light oil stocks.

Air Tanks
Gasoline Tanks
Oil Tanks

Riveted, Welded or Brazed



(Catalog on Request)

Scaife Copper-Brazed Tanks will hold air indefinitely without loss of pressure.

Wm. B. Scaife & Sons Co.
Pittsburgh, Pa.

New York — **26 Cortlandt St.**
Chicago — **38 S. Dearborn St.**

Heating the Home

Finishing Touches to Installation Require Paint and Cement

By George W. Graves

AFTER installation connections are made at the motor, it is necessary that the motor be oiled. In bricking up the ash pit door great care should be used. It is advisable not to force the bricks against the sides of the ash pit door or frame, or wedge bricks against the sides of the pipe or part of the burner, but a very substantial wall should be built.

> *"A GOOD effect can be accomplished by the installation men if they are equipped with a small quantity of aluminum or bronze paint, using this on all oil and gas lines installed, and touching up every part of the boiler that might need it. A little black paint used on the ash pit frame, where it is not removed, the clinker and fuel doors, etc., will help to make a more completely satisfied owner."*

At least a half-inch opening should be allowed around the air, gas, drain and fuel pipes to permit the burner to be more easily raised or lowered, if this is found necessary to adjust the fire. This opening can be properly filled with cement after the burner is finally set.

Before cementing in, see that the drain pipe is at least half an inch lower at the trap end. In installing the auxiliary pipe, care should be used to see that the pipe is installed so as to terminate on the ash pit floor at a point directly under the mixer edge of the combustion chamber. In covering the bricks with asbestos cement, it will be found that the proper use of this material will result in neater looking jobs. It often is found that, with the application of cement, too much water is used, thus causing a marked shrinkage after drying out. Only sufficient water should be used with the cement to permit proper handling and finishing.

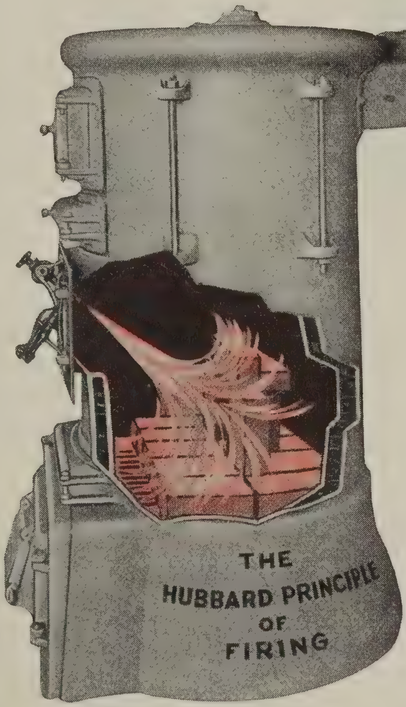
In the event that outside ash pit base is found uncovered it is advisable that it be properly insulated with brick and asbestos cement. The use of poultry netting or wire will assist in making a substantial and efficient job. In finishing up the installation, it is essential that a flushing of Portland cement and sand be

A Burning Opportunity!

for the man in each State who wants to get into business for himself and make from $5,000 to $15,000 a year.

We want territory men to appoint and work with dealers. We pay commissions on original order and repeat business.

Build a Business for yourself and reap the profits.



Are you
Big Enuf?

Are you
financially
able?

HUBBARD OIL BURNER

1125 Nicollet
Ave.,
Minneapolis,
Minn.

used around the ash pit base next to the floor, in order that air openings around the ash pit base be closed. The use of salt in this mixture will prevent the usual cracking.

Any openings left when removing shaker bars, or any openings which may be found for every coils, etc., should be properly sealed. It is the custom for every steam, vapor or hot water installation to be equipped with pressurestat, vaporstat or aquastat, and it is advisable to install them at a point higher than the top of the boiler.

Fluctuating water lines in the boiler should be reported immediately in writing, so that arrangements can be made for correcting this condition promptly. When installing aquastats, particularly of the service type, care should be exercised in removing the asbestos covering. A six-inch section of covering immediately around the pipe should be removed in order that the aquastat can be strapped directly to the pipe. When this is completed, the space where the pipe covering was removed should be filled in with asbestos cement and wrapped with canvas.

A good effect can be accomplished by the installation men if they are equipped with a small quantity of aluminum or bronze paint, using this on all oil and gas lines installed, and touching up every part of the boiler which might need it. A little black paint used on the ash pit frame, where it is not removed, the clinker and fuel doors, etc., will make a more completely satisfied owner.

SETS NEW RECORD

On Low Service Cost

OIL-O-MATIC, the remarkable new-type oil burner, by actual test, requires less servicing than a high grade washing machine. One service call for each 104 hours of running time was the best any electric washer could show. OIL-O-MATIC operated 1050 hours, ten times as long, with only three service calls. Two of those calls were for trouble not in the burner. The third was for a minor adjustment.

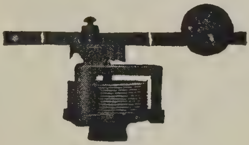
Get full information on the oil burner that has solved the burner problem. Some desirable territory still open for live dealers. Write today.

C. U. WILLIAMS & SON

Main Office and Plant
Bloomington, Ill.
Branches in all leading cities.

WILLIAMS
OIL-O-MATIC
HEATING

4 Ways to Get Regularity of Service and Safety in House Heating Oil Burner Installations



No. 22 for low pressure steam jobs. Also No. 924, extra sensitive type.

No. 45-A for hot water boilers. Also No. 45 for garage, laundry or service heaters.

Regitherm for control of room temperature.

Automatic regulation is necessary on every oil burner installation if you would secure regularity of service. Use these Sylphon Regulators to get this regulation and relieve yourself of a great deal of service expense.

Hitch Up In This Way

For Steam Heating use No. 22 or No. 924 Sylphon Damper Regulator.

For Vapor Heating use No. 925 Sylphon Damper Regulator.

For Hot Water Heating use No. 45 or 45-A Sylphon Damper Regulator.

All of these regulators will automatically feed only the amount of oil necessary and avoid the danger of the oil flame (unless cut off) running away with the temperature.

For Room Control use the Sylphon Regitherm, which is connected to the Regulator and placed in the living room or central part of the house.

Let our district engineers talk with you about these instruments. A postal will bring Bulletins ZDR and ZR-4 and 5.

THE FULTON COMPANY, KNOXVILLE, TENN.
Originators and Patentees of the Sylphon Bellows
Sales Offices in: New York, Chicago, Detroit, Boston, Philadelphia, and all the principal cities in the U. S.

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Darling Brothers, Ltd.,
120 Prince Street, Montreal, Canada

M-K-T Railroad Gets Excellent Results During Five Years of Oil Burning

By Arthur G. Winkler

SIGNIFICANT results, proving the superiority of oil over coal as fuel, have been obtained by the M-K-T Railroad, one of the largest in the country, since its change to oil about five years ago At the present time this company is the largest single purchaser and consumer of Mid-Continent fuel oil.

> *IN every case of a railroad turning from coal to oil fuel in which the results have been made public, the experience of the M-K-T, including the economies and greater efficiencies effected, has been paralleled. Another type of oil burning locomotive, which will probably show still better results, embodying the highly efficient Diesel engine, looms as the locomotive of the future. Several engines of this type exist, but are still more or less in the experimental stage.*

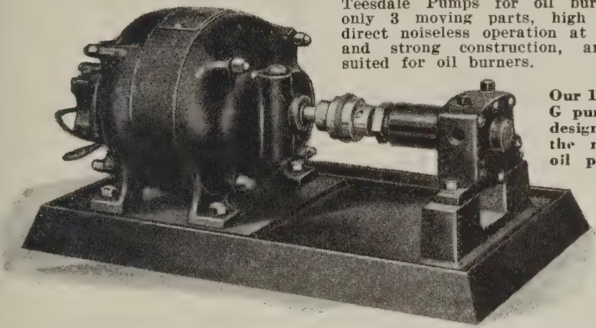
The conversion to oil, in 1919-20 was necessitated because of the rapidly growing scarcity of coal at advantageous points along the line and the attendant increase in its price. Naturally much investigation preceded the action, and the future oil supply, expense of converting the coal burning engines to oil, erection of storage tanks, equipping roundhouses to repair burners, all received consideration and were compared with the cost of operating on coal. The saving shown over the old system was large enough to cause the Katy's fuel experts to order the change made as quickly as possible.

Cost of transportation was another important factor. Coal is mined near the M-K-T tracks in Missouri, Kansas and Oklahoma, but not in Texas where a large mileage exists. When using coal on the Texas divisions it was necessary to take company coal cars out of service to haul company coal, and the haul itself was very inconvenient, adding the expensive feature of sending the cars back over the many miles of track to the mines empty. With oil, however, the movement is from more evenly placed points and, not being in only one direction, can take place at favorable opportunities, thereby lessening the expense

The first contract for oil, which was with Mexican producers, expired several months ago and new contracts have been made with

Simple — Durable — Noiseless

Teesdale Pumps for oil burners, having only 3 moving parts, high suction lift, direct noiseless operation at motor speed, and strong construction, are especially suited for oil burners.



Our 1/6-h.p., Type G pump has been designed to meet the need for an oil pumping unit for float switch or standby operation.

Write for Descriptive catalog on Types B and C pumps for pressure work

We Build to Customer's Order to Fit His Apparatus

Teesdale Manufacturing Company

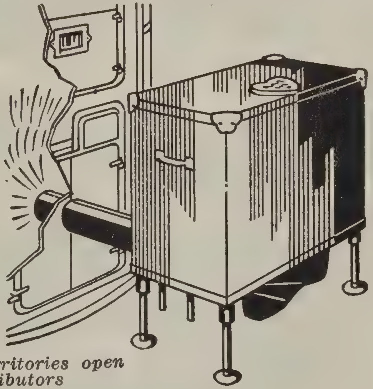
320 DOUGLAS STREET GRAND RAPIDS, MICHIGAN

"Most Sensible Facts I Ever Read"

That's just what you would say if we could tell you here, the startling reasons why Hart Heat is preferred for safety and economy.

You'd be interested too in knowing how these new facts make Hart Heat easy to sell.

Write for this information.



There are still a few territories open for responsible distributors

Hart Oil Burner Co.

"HART HEAT"

Department 101 Peoria, Ill.

Mid-Continent companies, insuring a supply of about 5,000,000 barrels during the next three years.

At present the M-K-T operates 530 oil burning engines and 64 which burn coal. The former run on 3,188 miles of the road's tracks, while the coal burners operate over but 168 miles.

Practically all of the oil burning locomotives now in operation on the Katy are converted coal burners, the transformation being made in the various M-K-T shops. To change a coal burning locomotive to an oil burner necessitates the removal of all appliances, consisting of grates, grate side bars, ashpans, front end nettings and other attachments, and substituting the standard appliances for oil burners. No change in the shape or general layout of the firebox is necessary, although the lower portion is lined with fire brick. The ashpan is also lined with firebrick.

The oil storage tank on the tender fits very well into the space formerly occupied by the coal. Steam coils running through this tank keep the oil warmed to the point where it will flow easily, and it is rarely necessary to force it to the burner under pressure. Before entering the burner it passes through a preheater that brings it to a temperature where atomization is made easier.

Steam Jet Burner

The burner is of the steam jet atomizing type, using the syphon principle to draw the oil into the nozzle where the steam jet breaks

CON-TAC-TOR MERCURY SWITCHES

Solve YOUR Control Problems

NEW SAFETY CIRCUIT

ABSOLUTE CON-TAC-TOR CORP'N

Beloit, Wis.

it up and carries it into the firebox. The nozzle is placed at the front end of the firebox in the center, thus directing the flame back through the middle of the firepan until it strikes the flashwall at the rear The flow of oil and steam is controlled by valves operated by the fireman.

Experience has taught Katy fuel experts that 3½ barrels of fuel oil, or 1,088 pounds, are equivalent to 2,000 pounds of coal. The item of expense of coal and oil in the past has not been the item chiefly depended on as to whether it was best to burn oil, because the relative price of one ton of coal at the mine and 3½ barrels of oil at the refinery were the same In the final analysis, however, a saving has been shown through the adoption of oil. Aside from the question of fuel and fuel costs involved, the Katy management has found that oil burning engines meant

- —greater sustained capacity,
- —more work performance with the same or an equal number of engines,
- —maintenance of established schedules with heavier trains, leaving ample margins for delays.
- —handling equal traffic with fewer trains, and,
- —increasing capacity without expense of rebuilding tracks.

Boiled down, the foregoing means that steam pressure in a locomotive can be maintained at a maximum at all times when an oil burner is used. In the final analysis it has been found by the M-

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OIL BURNERS
Are Reliable and Economical

Simply designed, ruggedly built, efficient heating. Air is pre-heated as it passes through the arches. Oil thoroughly vaporizes and burns a clear, hot flame. Minimum oil required. Easily installed in stove, furnace or boiler. Practically no servicing. Guaranteed 10 years.

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DEALERS—If you are a reputable dealer and will mail us this ad we will make you an unusual proposition. Write for particulars —TODAY.

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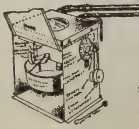


No. 10A and 16A type U Inter-State Oil Burners are listed as standard by the Underwriters Laboratories.

The Basel Valves and Heat Regulators

are now patented. Why? Because they are not just ordinary valves. They mean advanced theories in valves and valve control construction for Gravity and Mechanical burners.

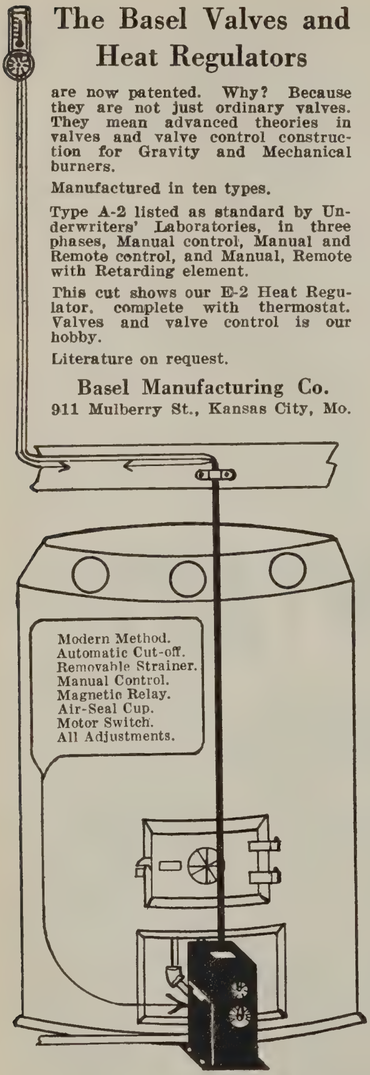
Manufactured in ten types.

Type A-2 listed as standard by Underwriters' Laboratories, in three phases, Manual control, Manual and Remote control, and Manual, Remote with Retarding element.

This cut shows our E-2 Heat Regulator, complete with thermostat. Valves and valve control is our hobby.

Literature on request.

Basel Manufacturing Co.
911 Mulberry St., Kansas City, Mo.


Modern Method.
Automatic Cut-off.
Removable Strainer.
Manual Control.
Magnetic Relay.
Air-Seal Cup.
Motor Switch.
All Adjustments.

K-T lines that fuel oil gives greater capacity over coal per pound of fuel burned, and not merely more weight and power.

It has also been found that the oil burner presents a 10 per cent increase in tractive power, thus cutting down the number of engines required to handle the same tonnage, "double-heading," and thus allows a fewer number of engines to be maintained, again making a saving. Handling cost is another important item, for fuel oil eliminates coal chutes, clam shells, and other coal handling devices and labor necessary to maintain them, substituting the clean and simple tank and pump units for storing the oil and loading the locomotives.

With the turn to oil the Katy lessened the expense of insurance on its own property, the loss from damage claims because of fires along the right of way, and the necessity for plowing and maintaining fire guards, all because there are no more dangerous coal sparks flying from the locomotive smokestack. Still another favorable feature is the cleanliness of travel, for the passengers are not annoyed by smoke and cinders.

One of the features of the oil burning locomotive that endears it to the heart of the mechanical department is the distance it can run without being shopped.

Roundhouse work, especially, has been lightened since the inception of oil burning, and it has been found that oil burners are turned in one-fifth the time it takes to turn coal burners, and at an average cost that is one-half less.

British Power Plant Costs Reduced by Using Diesel Engines

By A. C. Blackall

THE Diesel Engine Users' Association (England) in March of 1924 issued a second annual report on the working costs of heavy-oil engines, based on the returns of 34 Diesel and semi-Diesel generating stations at home and broad during the year 1922. A similar report for the year 1923 has just been published. This covers the operations of 37 stations comprising 129 engines of from 1000 b.h.p. capacity downward. There has been a slight falling off from the reports from overseas stations, but a more than corresponding increase from home stations.

The installed capacity of the home stations is 22,544 kw., while that of the overseas stations is 4,187 kw., making a total of 26,731 k.w. The total units generated by the home (British) stations during the year under review was 26,231,524, while that of the overseas stations was 7,963,567.

Service Lower

While plenty of the stations show high figures of engine hour runs, the average time service per engine has fallen from 2340 hours to 2060. This has, however, been due to some stations working in conjunction with bulk supplies, necessitating a reduction of their oil engine outputs. The average annual load plant factor has consequently fallen from 14.8 to 13.3. The average engine cost per unit generated has, however, improved from .987 to .899. This has been mainly due to reduction in fuel costs, as the average costs of repairs and maintenance has slightly increased.

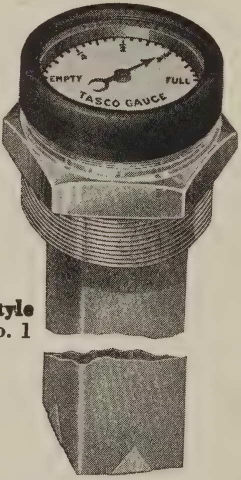
Taking the average gross calorific value of the fuel used at 19,500 B.t.u. per lb. the overall thermal efficiency of the 37 stations works out at over 23 per cent, and this figure exceeds that of the best modern steam station cited in the publication of the Electricity Commissioners on the Generation of Electricity in Great Britain. The average fuel oil consumption was .748 lb., per unit, which is slightly worse than last year and is not regarded as satisfactory.

Important Factor

Emphasis has recently been laid on the increasing part which the heavy oil-engine is likely to play in the generation of cheap bulk power. In the reorganization of the national power supply the heavy oil engine will be a factor which must find an important place. Full advantage of this means of power generation cannot, however, be taken with the present oil conditions in England. An important step in the right direction would be that of extracting large quantities of oil from coal. Meanwhile the heavy oil engine furnishes not only an economical means of giving exclusively

"Tasco" Gauges

are standard equipment on more than 50% of all Fuel Oil and Oil Burning devices on which gauges are used.



There are types for installation in ends, tops or sides of tanks—either with our standard flanges or with 1½ or 2 inch I P threads.

Send for complete information on different styles

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"40 *Years in Business*"

Akron, Ohio

a supply of electrical energy, but also a most economical means of providing stand-by plant and generating peak-load components of the electrical output required in many situations. Not only is there a broadening field of application, but much larger sizes are proposed with quite the same degree of confidence as marked the installation of the small units ten years ago.

Auxiliary Uses

In addition, heavy-oil engines are not only proposed as providing an efficient combination with large steam plants, but they are even suggested as auxiliaries to hydro-electric installations. The correlation of the experience of the many stations now in operation cannot fail to contribute important services in the development of this type of prime mover, and in the first instance help to clear up some of the little difficulties in arriving at the most satisfactory basis for the comparison of the experience of the various users of this class of engine. One of these is the allocation of the costs of repairs and maintenance. In an earlier report six undertakings gave an average figure of $4.70 per kilowatt installed, while the corresponding figure in the present report for 29 stations was $4.90. The tentative inference is that the average maintenance cost approaches a constant annual value of $4.80 per kilowatt installed. This basic figure is strengthened by the batch of figures in the present report, which further goes to show that the maintenance cost per unit generated will vary inversely with the annual plant load factor.

Twelve reasons why ABC is the leading oil burner

1. Quiet ABC is really quiet. Allowances are not made after installation.

2. No Carbon or Soot Engineers know what an immense advantage this is.

3. Less Oil Required Unique means of atomization assures complete combustion. Every particle of oil is burned. The heat rises slowly and is completely absorbed by the boiler.

4. Longer Boiler Life Circular flame, evenly applied all around the boiler, greatly increases its life.

5. Burns Low-priced Oils ABC burns gas oil and fuel oil.

Odorless An ABC heated home is odorless.

7. No Unsightly Parts Outside of Boiler This ABC feature has made sales.

8. Simple Only one moving part subject to wear.

9. No Fan or Blower Heat is not blown up the chimney and wasted. No noisy fan introduces ABC to your guests.

10. Clean It's useless to say how clean ABC is. You must see to appreciate.

11. Automatic Heat when you want it—as you want it.

12. Oil Burned in Suspension.

Executives Wanted

to open exclusive sales agencies

Men with sales or organizing ability, men with capital to invest, there is no industry with so rich a future as the selling of oil burners. An ABC exclusive agency is worthy of your earnest consideration. Let us send you the facts.

AUTOMATIC OIL BURNER CORPORATION
312 NORTH MAY STREET CHICAGO

ABC OIL BURNER
no noise – no carbon

The Book Shelf

Copies of all books reviewed in this department may be obtained from FUEL OIL, check to accompany order.

Steam Boilers. By Terrell Croft.
(McGraw-Hill Book Company, New York. Illustrated, 412 pages, $4.00.)

This work is designed for the use of those who may have occasion to seek information on steam boilers, without resorting to highly technical treatments of the subject. It is divided into twenty-five sections, following each with a list of questions and answers. Mr. Croft has included over 500 illustrations, which make for a maximum of clearness. He also discusses the functions and historical development of the boiler, boiler codes and inspection, elements of boiler construction, combustion and fuels, boiler accessories, management and maintenance and selection. The section devoted to petroleum fuel describes the advantages and disadvantages of fuel oil, fuel oil combustion, oil burners, fuel oil pressures, and fuel oil operation.

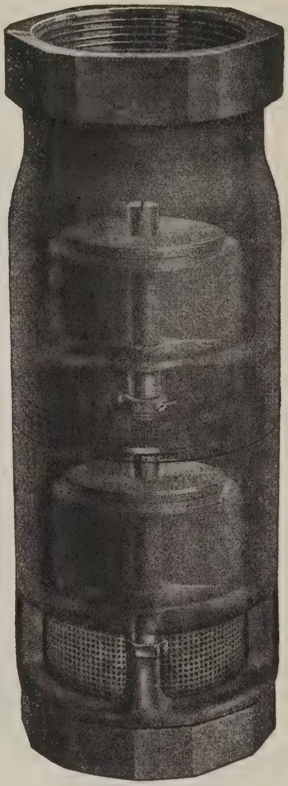
This is not the book for the man who desires only fuel oil burning knowledge. But if he is hungry for general steam boiler information, with just a taste of oil fuel facts, this is the book he is looking for.

Oil Fuel—Its Supply, Composition and Application. By Edward Butler, M. I. M. E.
(Charles Griffin & Company, London. 310 pages. Illustrated, $5.)

In this work, Mr. Butler covers the development of the application of oil fuel in industrial and domestic plants very thoroughly, discussing the uses of fuel oil for merchant marine purposes, naval purposes, locomotives, road vehicles, motor launches, metallurgy, lighting, and domestic purposes. Realizing the importance of oil, especially for the use of the navies, he expresses surprise that so little attention has been given to the problem. Chapters are included on the origin, production, and supply; economic aspect and heat value; chemical composition; combustion conditions; types of burners; relative advantages of the various kinds of atomizing agents; and early methods of fuel oil combustion. A feature of the treatise is the large number of illustrations and tables. It should prove a very useful addition to an engineer's library. The author's style is good and his ideas are stated in a clear convincing manner. It is a book of practical value, however, and not a mere compilation of Mr. Butler's theories.

Designing Heating and Ventilating Systems. By Charles Fuller.
(U. P. C. Book Company, New York Illustrated. 245 pages, $3.00.)

Mr. Fuller, covers the theory and practice of ventilating and heating



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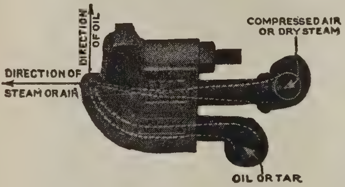

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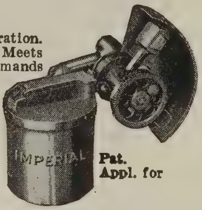

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in such a manner as to eliminate as far as possible all difficult mathematical considerations, without sacrificing accuracy or thoroughness. The work includes many illustrations and curves. To enable the reader to grasp the principles given the author has included many problems and their solutions. The book will serve both as a text book for the student and as a guide for the heating and ventilating engineer.

Takes Maryland Agency

R. J. McMahon, 222 W. Franklin Street, Baltimore, Md., has taken over the agency for the A.B.C. burner for the State of Maryland.

Samuels Distributing Evans Burner

John P. Samuels and Company, Chicago, are now distributing the Evans oil burner, according to a recent announcement.

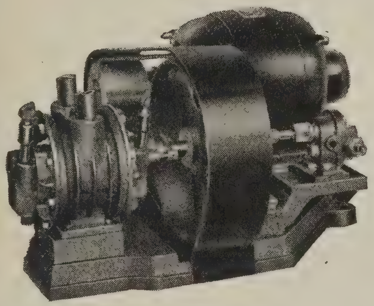
Opens New Office in St. Louis

George Kingsland has been placed in charge of the new office of tre Minneapolis Heat Regulator Company at St. Louis.

Make Unusual Fuel Oil Engine

An internal engine of a new type is being made by the Petroleum Motors Corporation of Rockford, Ill. In each cylinder is placed an extra piston that is said to utilize the power upward as well as downward. The engine burns kerosene or distillate. Details are given in a recent pamphlet of the company.

LAMMERT ROTARY PUMPS
FOR OIL BURNERS



A dependable pump built for 20 years—Sizes 3½ to 700 cu. ft. Free air per minute pressure to 25 lbs. Types for special requirements.

Oil pump coupled to air pump shaft.

Simple construction — No valves or troublesome parts. Automatically lubricated.

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Oil Burner Dept.
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Don't have your customers depend on a stick to measure the oil in the storage tank. Use the modern method.

A Pneumercator Tank Gauge

may be placed anywhere. It tells instantaneously how much oil there is in the tank. Make it standard equipment.

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KELLOGG COMPRESSORS

Air Compressors.
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Special Oil Burning Equipment.

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That is another one of the reasons why Chalmers Oil Burners enjoy the popularity they do today.

Every feature built up from standardized units, and backed up by our guarantee, Chalmers Oil Burners have earned a reputation that no amount of money could buy.

To become affiliated with this organization as a Chalmers Agent offers a substantial profitable proposition to the right man.

Correspondence with substantial parties looking to permanent affiliations is solicited.

Chalmers Oil Burner Co.
Minneapolis Minnesota
Member of American Association of Oil Burner Manufacturers

HEATING PROBLEMS AND OIL BURNING

(*Continued from page* 16)

come the difficulty of uncovered mains, increase the amount of radiation in a room, etc., but that is no reason why, if the prospect has originated from such an experience, the oil burner salesman cannot develop it into a successful installation and that is what my plea is for —*more rigid engineering and inspection before installations as well as after,* so as to insure the most economical and successful operation possible.

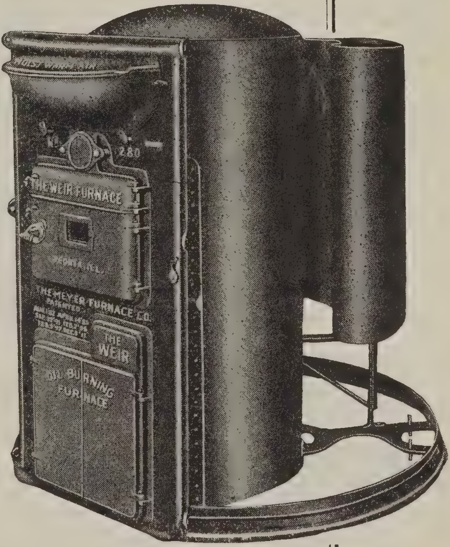
There is no law against the oil burner salesman suggesting to an owner that certain radiators are short circuited because of the manner in which the branches are taken off the mains, or that the radiation in any one particular room or rooms is insufficient and should be added to, or that the system is equipped with poor air valves. In other words, the oil burner simply enables the owner to use a cleaner and more uniformly smokeless fuel.

As regards the installation of oil burners in warm air furnaces, it seems to me that this Association should take some definite stand on several engineering features in this connection. For instance, the warm air and cold air conductor pipes, as well as the casing around the furnaces at times collect considerable dust. It seems advisable, therefore, that before installing an oil burner in a warm air furnace these pipes be thoroughly cleaned, also that the casings be removed; and if it be a cast iron furnace, that all joints be re-puttied to insure against the pos-

The WEIR Furnace

is not an experiment

It has been over 40 years on the market, growing in popularity year after year, and today it is recognized as the one proven warm air furnace for oil burning.



Get the Facts about
The WEIR Oil Burning Furnace

Write

THE MEYER FURNACE COMPANY
PEORIA, ILLINOIS

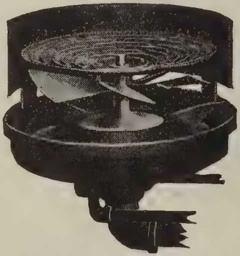
sibilities of gases being allowed to escape to the conductor pipes and thence into the rooms. If the dust is not thoroughly removed from the warm air chambers and the burner is of the intermittent type where the fire is either on 100 per cent or off 100 per cent, there will periodically be odors of scorched dust coming from the registers.

While the question of draft is always an important factor in any heating plant, it is extremely important in warm air furnaces as there should, at all times, be a negative pressure in the fire pot of a warm air furnace in which an oil burner has been installed. This will tend to lessen the danger arising from the products of combustion being forced into the air spaces surrounding the fire pot.

In checking up the size and installation of a warm air furnace it is strongly recommended that the Code prepared by the National Warm Air Heating & Ventilating Association be strictly adhered to. In inspecting cast-iron boilers before burners are installed, great care should be taken to see that all air leaks between the boiler sections and around the fire and cleanout doors, also between the floor and the base of the boiler, are sealed, as these leaks have a very damaging effect on the efficiency of the installation.

Good Joints Necessary

It is recommended so far as possible, that where new sectional boilers are installed to be used with oil burners that the sections be brought together iron to iron so tightly that no putty is required to make the



The Rotary Oil Burner

is designed for use in steam and hot water heating systems, hot air furnaces, water heaters, ranges, etc. It produces maximum furnace efficiency by vaporizing the oil and mixing the oil-gas with the proper amount of oxygen, at the point of combustion. Uses fuel distillate of 27 to 36 gravity.

ROTARY MANUFACTURING COMPANY
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Eastern Manufacturer, 1934 Market St., Philadelphia, Penn.
Established 1908 Handled by distributors
Chicago, St. Louis, San Francisco, Oakland and others

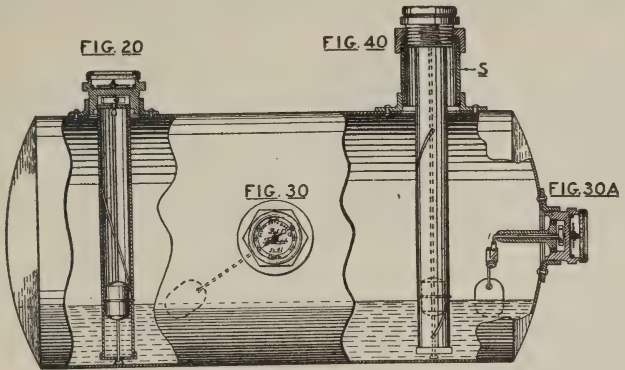


Fig. 20, Triumph No. 26 O. B. Upright gage, shown in section.

Fig. 30, Triumph Jr., No. 41 gage, applied to side of **tank.**

Fig. 40, Adaptation of Triumph No. 26 O. B. gage for storage tanks buried underground.

Fig. 30A, Triumph Jr., No. 41 gage shown in section, applied to dome end of tank.

"*Triumph*"

Magnetic Oil Tank Gages

are

Durable—Dependable—Safe

The indicating pointer on all models of the "Triumph" is a compass needle which is revolved by the turning of a magnet under a solid diaphragm. This makes the gage absolutely safe for use below the level of the fluid, for even if the glass becomes broken there is no opportunity for either the fluid or fumes to escape.

An actual test by the Underwriters' Laboratories showed that a pressure of 1500 pounds was necessary to cause a rupture of the diaphragm.

Eighteen years of gage manufacturing experience have gone into the perfection of this gage.

Write for details of Model Jr. No. 41 and Model 26 O. B., which are special designs for oil burning equipment and are listed as standard by the Underwriters' Laboratories.

The Boston Auto Gage Company
28 Clapp Ave. Pittsfield, Massachusetts

joints tight, as a putty joint is very unsatisfactory in vertical sectional boilers.

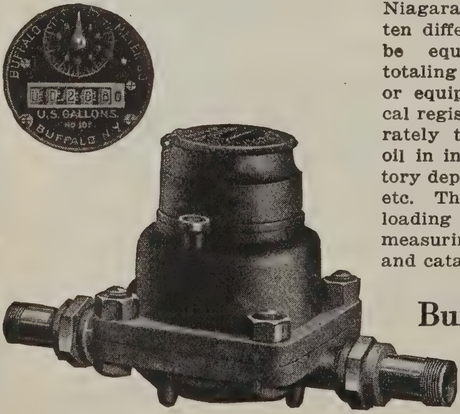
Care should be taken to see that all dampers which are necessary on coal burning boilers to regulate the air supply, and check the draft, but which are not needed on boilers burning oil, be so set as to be in the correct position for the oil burner and then fixed so that they cannot be moved. This will eliminate a great deal of trouble.

I realize that it is quite a problem to always have every installation reviewed by a competent engineer before the order becomes a contract. In view of that, I would like to suggest that a committee be appointed by this Association to formulate some kind of an information blank to be filled in by the salesman taking the order. This blank should be attached to the order and be referred to some one in the organization who is capable of deciding whether all of the factors in the case are conducive to an efficient oil burner installation.

As a suggestion, I would offer some such form as this:

Customer's name ....
Address ....
Persons interviewed in making this report ....
Kind of Building? ....
Frame .... Stucco.........
Brick ....
Kind of Heating System?.............
Steam.............. Vapor........
Vacuum ....Water ....or Hot Air?....
Make of Boiler..... Type..... Size.....
Manufacturer's Number ....
How long has present boiler been installed? ....
Is boiler covered? ....
Size of chimney flue....................
Height of chimney ....
Location of boiler with reference to chimney ....
Are there any offsets in the chimney?....
Are there any other openings into the chimney besides the boiler flue?.......

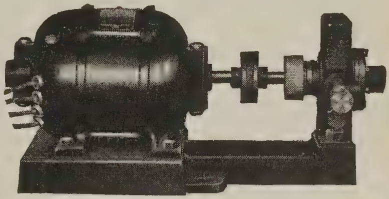
NIAGARA OIL METERS



Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.
2926 Main St.
Buffalo, New York

PAUL
Type "RRO"
Revolving Reciprocating
OIL PUMP
Noiseless—No Valves—No Packing—No Vibration—Double Acting—Uniform Flow of Oil.



Make Your Oil Burner Installations Complete

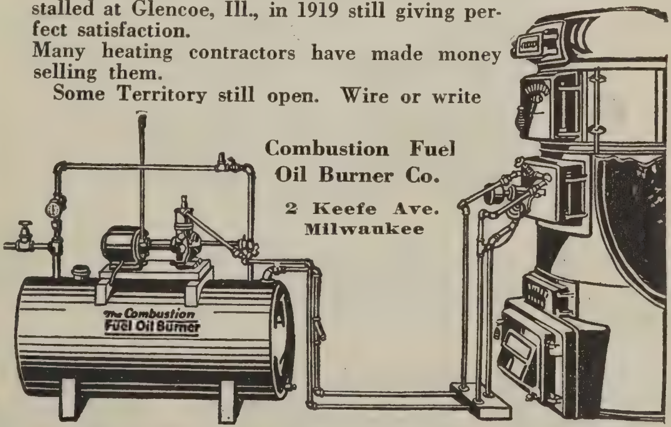
A small but very efficient pump especially designed for use in oil burner installations. Simple sturdy design without valves or internal packing means no "free service" or attention.

Ask for Bulletin No. 5031

FORT WAYNE ENGINEERING & MANUFACTURING CO.
Main Office and Factory, 1712 North Harrison St.
Fort Wayne, Indiana

A Perfect Fuel Oil Burner

Backed by six years' experience. First one installed at Glencoe, Ill., in 1919 still giving perfect satisfaction.
Many heating contractors have made money selling them.
Some Territory still open. Wire or write



Combustion Fuel Oil Burner Co.
2 Keefe Ave.
Milwaukee

What is the total amount of radiation installed in sq. ft.?....................

Are there any rooms that have not been properly heated?.................

If not, is there sufficient amount of radiation in each room?...............

Are windows equipped with weather strips? ....

If it is a steam system, does it have good air valves and are they working properly? ....

Are quick vent valves installed on the return main before the dry return changes to a wet return?.............

If it is a vapor system, what make of system? ....

Is the water in the boiler clean?.........

If not, will owner have it boiled out by the overhead system?..............

Are all steam and return mains covered? ....

Do all dampers in the boiler function properly? ....

Is there a coil for heating domestic water in the fire pot?................

If it is a hot water system, are flow and return mains correct size?........

Are they graded correctly?..............

How are branch connections taken off from flow and return mains?..........

Is each radiator equipped with a compression air valve?..................

What is the location of the expansion tank and is it of proper size?.....

Do any of the branches short circuit the mains? ....

Has there been an oil burner installed in this boiler? ....

If so, is it still there?...What make?....

Does owner make any complaint regarding same? ....

If so, what?............................

Can the storage tank be placed underneath the ground near the outside wall? ....

Can it be placed in such a position that it can easily be filled from a tank wagon in the driveway?..........

Electric current available.....Volt......

Cycle ....AC-DC?............

Is gas available for pilot?...............

Record any other peculiar conditions under remarks.

REMARKS: ....

Burner Rests on Grate

Atwood Oil Burner, Incorporated, of Minneapolis is marketing a burner designed to operate while resting on the face of the ordinary furnace grate

GOULDS

Hand Rotary Pump for Fuel Oil Systems

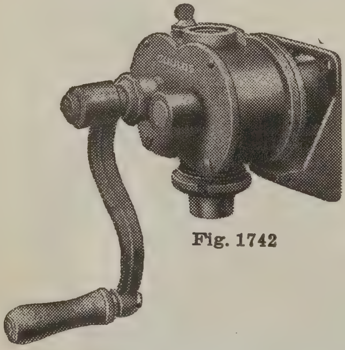


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings.

Furnished with or without bracket for attaching pump to side wall.

Capacity—10 gallons per minute.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. **Seneca Falls, N. Y.**

Atlanta Chicago New York Pittsburgh
Boston Houston Philadelphia Washington

The Sensation of the Oil Burner Convention

Hundreds of distributors and dealers inspected the Silent Automatic Burner during the Convention. Applications for distributorships and dealer franchises far exceeded our expectations.

Hundreds of others wrote for details—many telegraphed and telephoned.

It is the consensus of opinion that the Silent Automatic Burner is inevitably destined for conspicuous success.

Choice territories still open. Write or wire—giving details as to your territory.

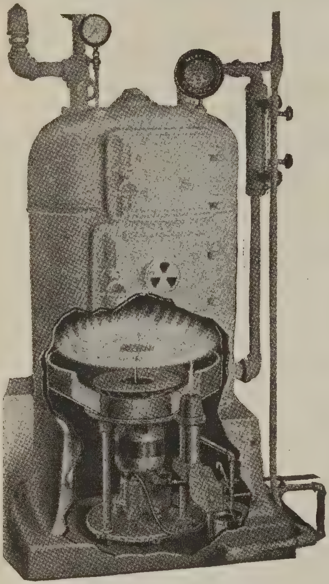
SILENT AUTOMATIC BURNER CORPORATION
255 Meldrum Avenue Detroit, Michigan

Silent Automatic Oil Burner

SUPER

Automatic

Oil Heater



General Electric 1/6 H.P.
Slow Speed Motor

Burns Fuel Oil for Home Heating. Live Agents Wanted.

SUPER

Oil Heater Company

275 Connecticut Blvd.

Hartford Conn.

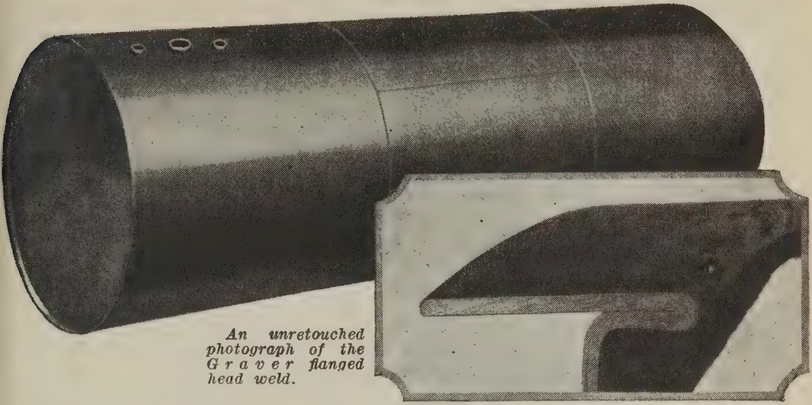
Ballard Oil Equipment Company, N. Y. C., Eastern Distributors.

Branches in Principal Eastern Cities.

REFLECTIONS ON ENGINEERING EXPERIENCE IN OIL BURNING

(*Continued from page* 14)

the beginning of the development. The question of freedom from dirt and a nice looking boiler room; with simple, easy controls and little work for the fireman, is one which appeals to most executives but when they realize that these very desirable features will cost them several thousand dollars a year, they soon lose interest. In a power plant oil must compete with coal on a dollar and cent basis, and if a thousand pounds of steam can be made for less money with coal than with oil why coal is the fuel that will generally be used. The manufacturers of oil burners for industrial use recognized this fact early in the development and as a consequence have produced burners which closely approach the theoretical limit of efficiency. This same improvement is gradually taking place in the domestic field. The domestic burner at first was rather like the automobile—it was a novelty and was a fine thing when it ran. They are, I believe, as a class well past this first stage and there are a number of extremely reliable burners on the market. The next step which I believe is well under way is to make them highly efficient. The time is fast approaching—at least on the North Atlantic Seaboard — when the domestic burner will have to meet coal on a price basis. The coal man recognizes the domestic burner as a very dangerous competitor and as a consequence is spending consider-



An unretouched photograph of the Graver flanged head weld.

No leaks and *extra* rigidity with Graver Flanged Inverted Head

This construction, as illustrated, overcomes the shearing stresses that are present at the junction of the heads to the side walls. The welded double-thick joint forms a supporting rib that holds the tank end rigid.

In addition, the flange permits an actual fusing of the head joint instead of the "soldered" type weld that is necessary with the more common construction.

This is but one of the many features of Graver Tanks. We make prompt shipments of standard sizes—ALSO there are exceptionally attractive prices on quantity lots—Write for prices.

GRAVER *Corporation*

(WM. GRAVER TANK WORKS—FOUNDED 1857)

Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment

160 Todd Avenue, East Chicago, Ind.

New York Chicago Tulsa Houston

TANKS

Immediate Shipment

Capacities: 220 gallons to 20,000 gallons

Dimensions: Standard dimensions

Thickness: No. 14 gauge to 5/16″

Openings: Four openings on top

Gauge sticks: Hard wood, accurately calibrated

Fill Caps: 2″ and 3″ in stock, water tight and non-water tight, brass or iron

Underwriters' Label is furnished on request

Guarantee for tightness: Seams guaranteed tight for ten years

Shipping point: New York City.

Black or galvanized can be furnished, manholes, special fittings, tanks of special sizes, etc. Tanks can be furnished and erected on the job.

THE LINDEMANN CO.
50 CHURCH ST.
NEW YORK CITY

able time and money on development of automatic coal handling devices in order to try and approach the cleanliness and simplicity of the oil burner in the home. There are several small stokers on the market which are subject to the same temperature control as the oil burner. They put the coal on the fire when needed, introduce the proper amount of air and put the ashes in the can. They burn the cheapest grades of anthracite and are most economical. This is the domestic competition we will have to meet and it behooves all of us to make the domestic burner as efficient a heat machine as the industrial burner. That this can and will be done I am confident.

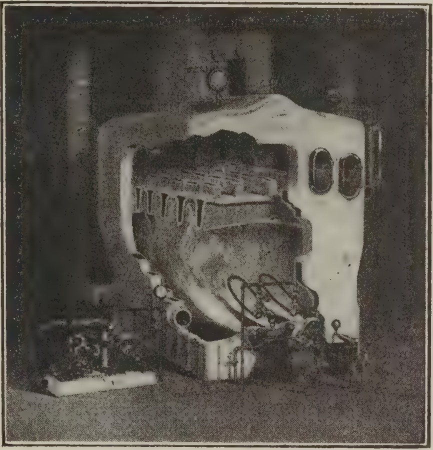
Remnsnider Announces New Safety Trip Valve

The Remnsnider Valve Corporation, St. Louis, has placed on the market a new oil control and safety trip valve. When the burner to which it is attached is flooded with oil a float pinion acts upon a cross member that releases a trip bar. The release of this bar allows a heavy arm to drop which immediately closes the valve.

May Factory Moved

New factory quarters have been obtained by the May Oil Burner Corporation in Baltimore, Md., according to a recent announcement.

Bockfinger and Cass of Chicago, are distributing literature on their Amherst incinerator. It takes up little space and is designed to burn any kind of gas.



Dealers!

Why not show good profits?

You can do it with Caloroil Burners. Why?

Because you won't have to service them continually and will therefore eliminate the largest item in your overhead. The product of our five years of experience in domestic oil burning is an oil burner which makes the word "servicing" almost obsolete. In actual tests—but let us give you this information confidentially. Just send us a note and we'll be glad to tell you anything you want to know about Caloroil Burners.

Caloroil Burners are thermostatically controlled; automatic; simply and quickly installed; easily regulated and understood; made in standard sizes to handle up to 12,000 sq. ft. of steam radiation; cause no carbon, smoke or odor; use 28° Baume Gravity Oil; and have a special vacuum oil feed system—neither force feed nor gravity.

Remember to write for more information

Caloroil Burner Corporation

7 E. 40th Street New York City

Bowles Emphasizes Importance of Cooperation

In a recent letter to C. H. Chalmers, president of the American Association of Oil Burner Manufacturers, James T-B. Bowles, newly elected technologist of the Association, stated that the oil burner industry is going through a tremendously rapid development and that the mistakes made by some few manufacturers in putting out poorly designed machines could only be expected under these circumstances.

"It seems to me," he wrote, "that one of the important points is to stress the difference in operation between a domestic burner, which has to be automatic and as near foolproof as possible, and the industrial burner, which does not necessarily have to be as automatic, and will be, in turn, not so fool proof.

"Another important point is that the oil companies should be made to understand the above so that the quality of their domestic fuel oil will be such as will give satisfactory results in a domestic burner.

"The situation existing between the oil industry and the oil burner industry is somewhat similar to that between the oil industry and the automotive industry. This condition has been very much improved during the last three years on account of some cooperative work being carried on by a joint committee, consisting of representatives of both industries and the Bureau of Standards.

"One of the most important results obtained so far has been for each to realize that they had room for further development, and fortunately the industry that needed the greater development began to realize it.

"Therefore, if we could work out a closer cooperation between the oil industry and the oil burner manufacturers, I believe that progress would not only be faster, but would be developed on a much sounder basis.

"In reference to the quality of oil for burners, I personally feel that one reason that oil companies have neglected this, is because many of them have not the proper equipment and "set up" to take care of that business. Furthermore, they are not exactly "sold" on the subject, and therefore hesitate to invest money to take proper care of the situation.

"I appreciate that the position of technologist is a new one to the oil burner association, and if I may be permitted to say so, I believe it will have a good effect on not only the oil burner industry, but on the allied industries as well. The statement does not sound very modest, since I have the pleasure of being your technologist, but my feeling in the matter is entirely impersonal."

Hold Dealer Meetings at Convention

Home Appliance Corporation, of St. Louis, Mo., and the S. T. Johnson Company, of Oakland, Cal., both manufacturers of oil burners, held dealer meetings, attended by their representatives from all over the United States, in conjunction with the Second Annual Convention and Exposition of the American Association of Oil Burner Manufacturers in Chicago, April 1, 2 and 3.

Gill

AUTOMATIC

Oil Burner

Sheer merit is the basic reason why heating engineers strongly recommend the Gill Automatic Oil Burner and why the Gill distributorship is most profitable.

Simple in construction—positive in operation, Gill Automatic Oil Burners give complete satisfaction.

You do not have to spend your profits servicing a Gill Burner.

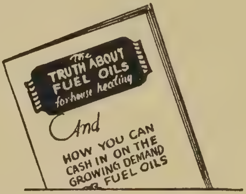
Gill Manufacturing Co.

8300 South Chicago Ave.
Chicago, Illinois

Write for details of our selling franchise

"The Truth About FUEL OIL for House Heating"

—An Empire Contribution
To a Growing Industry


The TRUTH ABOUT FUEL OILS for house heating
And
HOW YOU CAN CASH IN ON THE GROWING DEMAND FUEL OILS

After having made a wide investigation of the domestic, househeating market for fuel oil, we have published our conclusions in a handy little booklet entitled, "The Truth About Fuel Oil for House Heating."

This little booklet is already in its second edition and has created a great deal of interest among oil men and burner men all over this country and in many other parts of the world.

You are invited to write our Tulsa office for a copy now. There's no obligation.

CITIES SERVICE OILS
ONCE-ALWAYS

EMPIRE REFINERIES, Inc.

Subsidiary Cities Service Co.

General Offices, Tulsa, Oklahoma

Offices: New York, Philadelphia, Cleveland, Chicago, St. Paul, Atlanta, New Orleans, Kansas City, St. Louis, Ft. Worth

Consulting Page

Q. Can you give us any information on the conditions which would affect the sale of oil burners in Texas and Oklahoma? We understand there is a large supply of natural gas and this makes oil burner sales difficult. Is this natural gas reliable for use in an oil burner ignition device? Should we attempt to introduce electric ignition there? P. G., St. Louis, Mo.

Ans. Oil Burners are used extensively all over the Southwest, which, of course, includes Oklahoma and Texas. Industrial installations in particular are to be found in that territory in great numbers, especially among the refineries. Household burners, however, are not so common, due to the competitive conditions you mention. Natural gas has proved quite successful, and has a firm foothold, but that alone is no reason why oil burners should not be used to a reasonable extent. The gas there is as reliable for ignition as you will find gas to be in any part of the country. It is our opinion that the field for electrical ignition is not as fertile in Oklahoma and Texas as in other parts of the country, where gas is not so plentiful, but it could be successfully introduced, with a persistent and carefully planned campaign.

Editor, FUEL OIL:

On page 86 of the April issue we note an inquiry for an oil burner nozzle to spray oil mist through a drill hole, size 45 to 50.

We manufacture and have applied for a patent on a nozzle which will spray 28-30 Baumé oil through a size 80 hole at less than 50 lb. pressure. The hole is drilled in a horizontal position, but we see no reason why it could not be drilled at an angle of 45 degrees.

Hyle Oil Burner Company,
Baltimore, Md.

Q. We would like to know the address of both the Peabody Engineering Corporation and the Electromatic Appliance Corporation. G. F. E., La Crosse, Wis.

Ans. The former is located at 110 E. Forty-second Street, New York City and the latter is at Hamilton, Mo.

Editor, FUEL OIL:

In an article by C. H. Chalmers in the February issue of FUEL OIL, it is stated that no burner for domestic use has ever been approved by the Board of Fire Underwriters to use any heavier grade of oil than gas oil.

The Underwriter's latest Bulletin lists among domestic burners, one—the Johnson—handling successfully 14 gravity, and the Williams burns 26 gravity in this latitude.

In oil classification, much confusion would be avoided by the adoption of uniform terms according to gravity, by both burner manufacturers and oil men. Your influence in this direction might aid in the acceptance of a trade name for each of the many furnace oils according to their specific gravities and prevent statements that are often misleading.

This statement is offered not in the interests of any certain burner, but in the interests of the industry.

W. R., Atlanta, Ga.

In the list of inspected oil burners issued by the Underwriters Laboratories on April 1, the Johnson "Type 22" Rotary Industrial Oil Burner was approved to burn "fuel oil of 24 to 36 deg. Baumé." This, however, is an industrial burner and is not to be confused with domestic burners.

The subject of correct names for the various oils is a puzzling one. G. H. Rittenhouse, chairman of the American Association of Oil Burner Manufacturers' committee on simplification and nomenclature, in his report at the last annual meeting stated:

"It is almost impossible to classify or standardize fuel oils at the present time, because of the different sources and grades, refining processes and the demands of the burner manufacturers. The oil refiners are very much at sea, due to the many different types of burners demanding so many different grades of oil. However, it is the opinion of the authorities that the lighter furnace oils will soon be a thing of the past and the successful burners will burn the heavier grades. If this is true, it is the opinion of the committee that the quicker it comes the better it will be for the manufacturer, for it will tend to stabilize the industry and definitely set uniform oil conditions for all."

NATIONAL AIROIL BURNER

Airoil Burners

"are efficient"

The Complete Design and Installation of Oil Burning Systems

National Airoil Burner Co.
916 Thompson Street
Philadelphia

WE SPECIALIZE IN

FUEL OILS
GAS OILS

FOR DOMESTIC OR INDUSTRIAL PLANTS

DELIVERED EITHER IN TANK TRUCKS OR TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

OHIO REFINING COMPANY

TELEPHONE RIDGE 884
CINCINNATI, OHIO

Last year the report of this committee covered the subject of oil specifications as follows: ". . . the thing that is necessary for us to do, we believe, is to get all of the oil companies to classify their oil and have the terms used mean the same grade of oil to all companies. As it is today,in a great many localities, oil is classified, as a general thing, by its gravity, but as we all know, this is unsatisfactory and means little. Your committee has considered it from every angle and believes that in classifying oil one of the main things to consider is the end point of oil. However, this cannot be considered alone, inasmuch as viscosity and the pour test must be considered. After discussing the question and having the benefit of the knowledge of one of the representatives of one of our large companies, we have come to the conclusion that these classifications of various grades of oil must be worded so that they will be thoroughly understood by the average man buying the oil. We therefore have divided the oil into four groups as follows:

"1. Kerosene.
"2. Furnace Oil—Which would be used in non-pressure burners.
"3. Domestic Fuel Oil—This oil being the heaviest grade which can be used in domestic installations.
"4. Industrial Fuel Oil—which means, just as the name implies, oil which is usually used in large industrial installations."

When specific standards are set up for the various oils, cognizance must be taken of viscosities and flash points as well as of the Baumé gravity, and end points. At present the best plan appears to be to specify Baumé gravities, viscosities, end points, and flash points, without attempting to give the oil any trade name.

Q. Is there any method of computing the square feet of heating surface required in steam coils in storage tanks to heat heavy oils to a point where they can be easily handled?

E. C. McD., Decatur, Ill.

Ans. A few variables enter into such computation, but a number of oil burner engineers and oil men have informed us that a good general rule to follow is to provide 1 square foot of heating pipe surface for 60 cubic feet of tank volume.

There are a number of ways to provide the heat—exhaust steam, hot water, etc., and they naturally have much effect on the amount of heating surface required. A good plan would be to establish a ratio such as that above, and then let the individual owner find out by experiment, how much steam, hot water etc., must be admitted.

YOUR ad could occupy this whole page in **Fuel Oil** next month, and go into the hands of 12,500 oil fuel users for $85.00.

You can buy a space of this size, a quarter page, for $30.00
or

This little one-eight page costs $21.50. Cheap enough, if big enough.

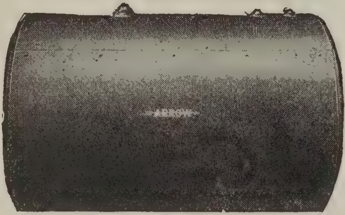
One twice as large, a half-page, for $45.00

Every Fuel Oil reader is a bona fide prospect for any article or service that can play a worthwhile part in Oil Burning

Prices are for 12-time contract

»»ARROW→

Unconditionally
Guaranteed
Oil Storage Tanks



The Novelty Steam Boiler Works Co.
929 S. Howard St., BALTIMORE, MD.

Sun Oil Burner

Lowest priced successful burner for domestic and industrial installations. Easy to operate. Endorsed by leading contractors. Over 15,000 users.

DEALERS: Write for details and proposition. Good territory still open.

Heat Equipment Corp.
134 So. 13th St. Lincoln, Neb.

THE IMPORTANT THREE-FOURTHS IN SUCCESSFUL BURNER OPERATION

(*Continued from page* 12)

be inadequate for the job, do not hesitate to advise your superior before starting the actual work, as it is easier to substitute a larger size at that time than later.

Make up all joints tightly so there will be no leaks to detract from the appearance or to create a hazard. Incidentally, if there are any old leaks in the water or other boiler connections, it will take but a few minutes to stop them and the customer will unknowingly give the burner credit for it.

Clean out the soot from flues and fire passages so as to enable the burner to operate with the utmost efficiency. Remove all ashes which might have accumulated through the negligence of the purchaser. Sweep up after your installation. Paint the boiler front and piping to harmonize with the burner, as this has a certain psychological effect on the owner, who is interested in the burner and will now renew his interest in the boiler.

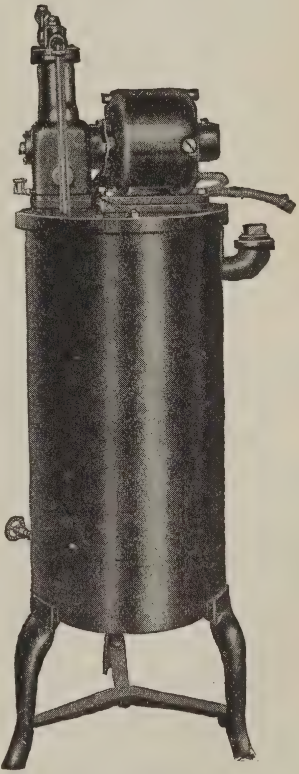
Advise the purchaser or some member of his family in detail regarding the care, operation and lubrication of the burner. This may save a night call during subzero weather. Before leaving adjust the damper and check draft, and see that the safety device functions properly. All these things are well worth doing and they are just as important as the mechanical construction of the burner itself in assuring a satisfied customer.

And here are others—

"The improvement of eliminating the overflow which you mention is an excellent one, as we are confronted with several installations where the tank is already installed and no overflow line provided. Just at present we have one job in which this type of pump is very necessary, and we are sending you our confirming order today."

"We have one of your pumps with a 15 gallon tank attached and it has proven very successful. The storage system of the Monroe pump is the best pump we have used to date, and we have used many different kinds."

The above letters can be submitted upon request.



MONROE MACHINE TOOL COMPANY

737 W. Jackson Blvd., Chicago, Ill.

Quality
Oil Pumps

HAND or POWER

We Can Fit
Our Designs
to Your Needs

*Send Us Your
Pump Problems*

Columbia Industrial
Machinery Co.
4020 W. Lake St.
CHICAGO

Electrical Engineer

And Automatic Power Oil Burner Designer wants financial backing for late type oil burner having especial points of merit as follows: Simple construction with low cost, in quantity production; centrifugal atomization to "fog" and combustion entirely in suspension; practically noiseless operation in hot air furnace; electrical ignition entirely new and basic, automatic control. Simplicity of design and absolute assurance of ignition demonstrated during past Winter of operation forecasts reduction of the service problem of distributor below any burner now on market.

Burner and Ignition system thoroughly protected by Patents Pending.

Satisfactory financial arrangements failing, will entertain outright sale for cash and royalty with or without personal service contract. Services available after August 1st, 1925.

Address: Designer, care Fuel Oil,
350 Madison Avenue
New York City

ANALYSIS OF OIL FLAMES

(*Continued from page* 10)

broken down to the gaseous form, the gas coming from the log is premixed at a low temperature with oxygen. This is exactly what takes place in the Bunsen type burner, with which we are all familiar, as it is the type used in gas stoves.

If we could make our oil burners burn as cleanly, and with as little noise as a gas stove, or a wood fire, we would indeed have reason to be proud of our products. In the final analysis there is no reason why we cannot do this, if we are willing to face the situation squarely and design mechanical means for giving us the results which nature provided with the log of wood. An appreciation of what occurs to produce different types of flame is the essential starting point.

Two Flame Types

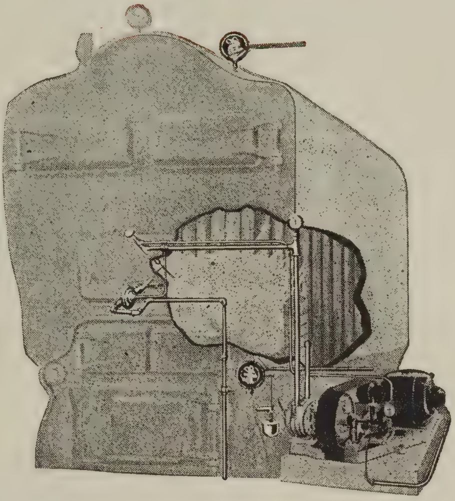
There are, broadly, two types of flames: The blue flame, and the yellow flame; but there are many combinations of part-blue and part-yellow.

The blue-flame indicates that the oxygen and the oil gas have been pre-mixed at a temperature below the temperature of ignition or, as stated from the point of view of the result, the combination of hydrogen and oxygen is going on at the same rate as the carbon and oxygen, and in step with each other.

The yellow, or radiant flame, is an indication that the mixing is being done above the ignition temperature, and after ignition has taken place, with the natural result that most of the hydrogen is

MARVEL

FUEL OIL BURNER



THE MARVEL OIL BURNER is a simple mechanical device, designed to meet the ever increasing demand for a practical, economical domestic FUEL OIL burner.

MARVEL'S METHOD of atomizing the oil eliminates noise and spreads the flame over the entire heating surface of the boiler which was not built for an intensely hot condensed flame.

ATTENTION DEALERS

IF MARVEL is not represented in your territory write to us. We still have some very desirable districts open. But act quickly.

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united before the carbon starts, thus robbing the atmosphere of oxygen and making the incandescent carbon rise to reach out for oxygen.

The blue flame means that combustion is taking place within the entire area between the side of the flame, whereas the yellow flame combustion is taking place along the surface only. The surface I refer to is the dividing line between the oil-gas and the air. The thickness of this area of combustion of course varies somewhat, but in a stream-line flame, in which eddy currents do not exist, I have measured the incandescent wall as about 1/32 of an inch thick, the layer immediately outside of this being mostly carbon dioxide for a thickness of about 1/16 of an inch, and then the pure air.

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A cross-section of a candle flame, which after all is the original and most wonderful heavy oil burner, discloses the following: Starting from the center, outwardly, we have first liquid oil, or paraffin, in the center of the wicks next we have a concentric ring of saturated oil vapor well below the ignition point; next we have a ring of oil gas, on its outer edges the temperature being up to the ignition point. The next ring is a very thin ring, not over 1/32 of an inch, of incandescent carbon particles kept in this state by the heat of the chemical reaction of oxygen from the layer of air and the hydrogen which shoots through the incandescent wall and steals

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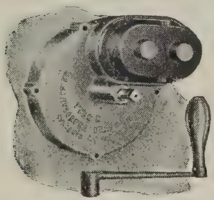

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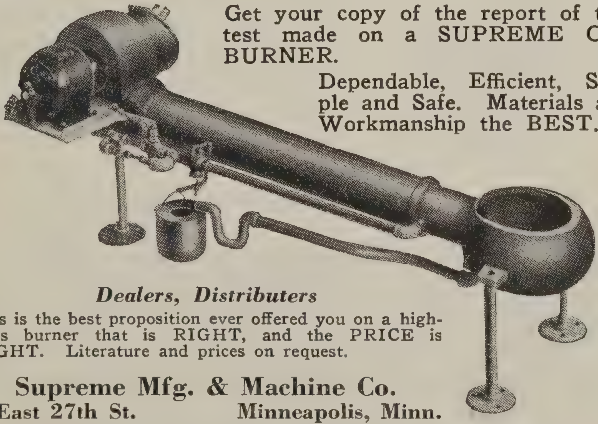

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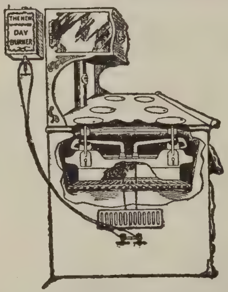

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the oxygen, and the next layer, which is rich in carbon dioxide from the chemical reaction of the air and the incandescent carbon, and finally the air itself.

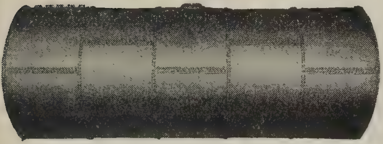
Let us carry the candle flame further, using this miniature burner, which gives perfect combustion and no noise, on the dining-room table, and see what would happen if properly installed in a boiler. In the first place if we would put the candle in the center of the boiler, the first objection would be that it did not heat the house. The answer to this would be simple. Put in a larger candle. Now when we put in a larger candle we increase the amount of oil-gas given off, but we do not supply any means for increasing the diameter of the circle of combustion, therefore, the flame must rise vertically in its attempt to reach out for oxygen. Let us suppose that in order to get enough heat from our candle we have to put in such a large candle that the flame is carried up into the boiler surfaces. We would now find that we would have a smoky flame, and soot would be deposited in the boiler walls, and up the chimney.

Secure Blower

The next step would then logically be to secure a blower and blow additional air into the flame, so that the oxygen could get into the incandescent carbon and combustion would be accomplished before the flame traveled to the top of the boiler.

The smoke trouble having been

Super-Riveted-Welded



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overcome, we are in more trouble. We find that if the blast of air is a little too hard, the flame blows out; or that if it does not blow too hard, the chilling effect of too much air is liable to cool the upper end of the flame and again produce smoke, though excess of air is at hand. The problem is now getting interesting. We have found that the addition of air is not the cure-all, but the temperature and velocity of this air are as important as the amount. The next step is usually to try the blow-pipe action. That is, to have a jet of air impinge on the flame, the diameter of the jet being relatively small with respect to the flame, so that a blast of air is thrown completely through the area formerly taken by the flame, and the suction action of this jet draws the balance of the flame into the path of the blow-pipe stream.

Good combustion always results from this method, and we think the oil-burner is going to be a success, but soon a complaint is registered that the noise is excessive; and if we are engineers, not salesmen, further research is necessary.

Wood Flame

Now leaving our candle oil burner for a while, let us examine a few of the successful flames, and measure their temperatures, the velocity of flame propagation, and the velocity of the admitted air at the time it strikes the oil gas, at or above ignition temperatures. First the log of wood, in which we have a mixture of hydrogen and carbon and oxygen brought up to the ignition temperature, and

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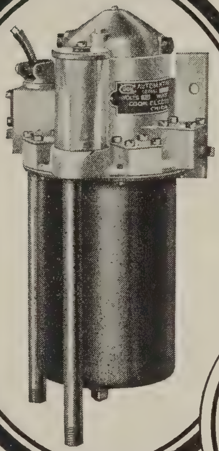

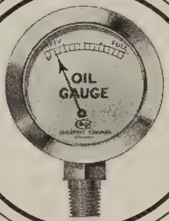

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mixed with air at velocities no greater than that produced by .02 of an inch draft, say roughly 300 ft. per minute. At .045 to .05 of an inch draft, a wood fire will roar like some oil burners, or at a velocity of approximately 900 ft. per minute the flame will leave the wood, and, if this velocity is not dropped, will go out. Therefore, the velocity of flame propagation for wood lies between 200 and 900 ft. per minute.

(*Continued in the June issue*)

High Speed Atomizing Cup Is Burner Feature

An oil burner embodying several new engineering principles is being introduced by the Simplex Oil Heating Company, Providence, R. I. Atomization is produced by a high speed turbine propelled by an electrically driven blower. The atomizing cup is operated by the turbine at a speed of 16,500 r.p.m. Others features of the installation include an electric oil heating apparatus and an automatic device for stopping the flow of oil when the burner is out of operation. Edgar L. Nock, is the designer of the burner. It is made in four sizes, and the pump and blower outfits in three sizes.

Draft Regulated Boiler

Northern Machinery Company of Minneapolis has recently issued a folder describing its automatic draft regulated boiler. The device is placed in the stack between the boiler and chimney. The machine is made in sizes suitable for heating moderately sized homes.

FUEL OIL
FOR HEAT and POWER

Devoted to developing and encouraging
the efficient, scientific use of oil fuels.

Published Monthly

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Vol. 3 June, 1925 No. 12

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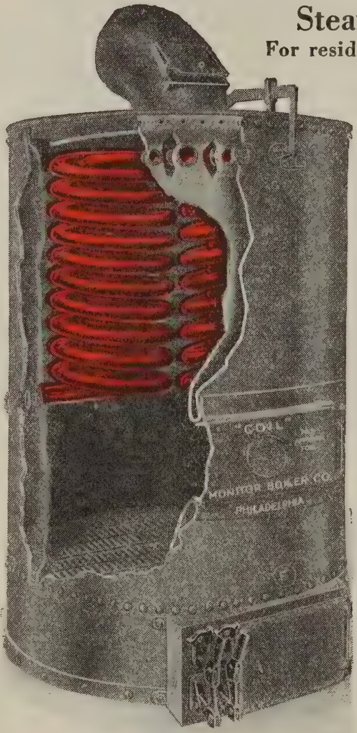

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Recording Instruments Aid in Efficient Burner Operation

By Jay Harris

REGARDLESS of what the determining factors influencing the choice of oil as a fuel are, it is only a matter of good business policy on the part of the organization that has decided on the use of oil to protect itself to the extent of being certain that it is getting full value for the money invested, of being sure that the equipment for burning oil is doing what is expected of it.

It is the custom to insert a clause in the contract for oil burning equipment that an equivalent evaporation of from 13 to 14 lbs. of water per lb. of oil burned must be attained. The contractors usually guarantee the possibility of obtaining this high performance for a year. It means an overall boiler efficiency of from 75 to 85 per cent and to maintain this efficiency day in and day out for 365 days in the year requires on the part of the operator a thorough knowledge of what the boiler is doing at all times.

The only way to be certain that the equipment is performing as it should is through the use of the proper boiler room instruments. The weighed-water boiler tests that are frequently made by contractors to obtain the owner's acceptance of the equipment are without doubt correct and authentic during the time of the test. After the test is over, however, the owner has no means of knowing whether or not the test conditions are being maintained unless his boilers are equipped with the correct instruments.

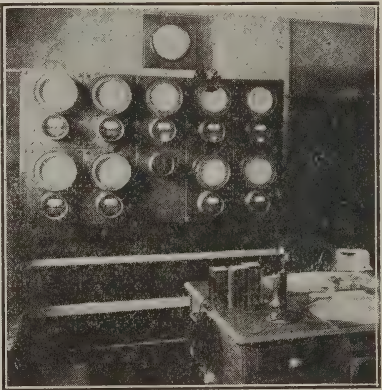
Continuous Records Best

The proper instruments by means of which a continuous record of evaporation can be obtained and by means of which the efficiency of combustion can be maintained are steam flow meters and CO_2 recorders. Accurate flue gas temperature records and indications of the draft over the fire are also of great importance in assisting the operator to get good results, but the steam flow meter and the CO_2 recorder are really essential.

The steam flow meter is an instrument which will indicate, record and totalize the number of pounds of water or steam evaporated by the boiler. It gives a continuous and accurate record of the boiler output. When the total number of pounds of water evaporated by the boiler as obtained from the steam flow meter readings is divided by the number of pounds of oil burned in the boiler for the same period, the evaporation or the rate of boiler performance is the result.

If the boiler and its setting are in good condition, if the oil burning equipment is properly designed and installed, and if the furnace is properly suited for efficient combustion, the cause of a failure to obtain the required evaporation is due to poor operation and usually to the operator's failure to regulate the air supply to the boiler correctly.

However, the fault can not be justly placed to the discredit of the operator, if he is without the means of knowing the effect of his efforts in regulating the draft or air-supply to the boiler. For his assistance he should be provided with the proper instrument so that he will be able to know at all times the result of his efforts. The proper instrument is the CO_2 recorder.



Typical panel board in plant engineer's office showing steam flow meters and CO_2 recorders

The percentage of CO_2 in the flue gases leaving the boiler is a direct indication of the relative volume of air supplied for the combustion of the oil. It requires a definite number of cubic feet of air to completely burn a pound of oil the oxygen of the air combining with all of the carbon in the oil to form carbon dioxide. If too much air is supplied for the burning of the oil, considerable heat is wasted on it. Too much air is indicated by a low percentage of CO_2. If insufficient air is supplied for the burning of the oil, the oil will not be completely burned and part of it will be lost by the formation of carbon monoxide, which passes out through the stack. Insufficient air is usually indicated by too high a percentage of CO_2 and by smoke. Generally speaking, the maximum theoretical percentage that can be obtained by complete combustion of fuel oil is about 16 per cent. Due to practical considerations and limitations, however, a certain amount of excess air is necessary for continuous good

(*Continued on page* 74)

Reduce Apartment House Fuel Costs by Burning Oil

By S. D. Rickard*

AN interesting and decidedly economical commercial installation of oil burning equipment is now in use in the Duncan Apartments, Jersey City, N. J. This is considered one of the largest and finest apartment buildings in the State of New Jersey.

The second complete heating season during which this buildng has been heated with fuel oil has just come to an end, and accurate records show a saving in the use of this fuel of approximately $2,500 per year, or better than 35 per cent over the previous cost of firing with coal. Considerable pride is taken in the boiler room by the owners and this room, as the photographs show, is one of the cleanest and brightest rooms in the building.

The heating equipment consists of three Titusville Boilers, each rated at 9,600 square feet of steam radiation and one of 4,500 square feet of steam radiation. Two of the three large boilers are of ample capacity to heat the building during the coldest weather. The third boiler is simply a spare unit. In warmer weather only one of the large boilers is used. The small boiler is used for heating service water and as a garbage and waste incinerator.

Boiler room of the Duncan Apartments, showing installation of oil burners. The small boiler at the right is used as a water heater and incinerator

Each of the three large boilers is

(*Continued on page* 46)

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*Engineering Division, Preferred Utilities Company, New York.

What Oil Burner "Service" Really Means

By H. A. Geauque*

THIS is the first of a series of articles by Mr. Geauque in which he will discuss oil burner ignition and combustion. Future articles will contain data and results obtained in experiments that the author has been making during the past year. Mr. Geauque's knowledge of chemistry is one which enables him to speak with considerable authority on the more technical and scientific phases of oil burning.

THE public is often given the impression that the one simple requirement to make fuel oil burn is to have an oil burner. We read with interest the articles on the methods used to sell oil burners, including complete details of the sales methods that are convincing and that make friends of the purchasers. Of these stories the most interesting seem to be narratives of two salesmen having oil burners of equal merits. The hero of the narrative makes the sale by giving freely some sort of service which marks him as an authority on heating systems in general and the customer's system in particular. There is, of course, the usual bait that the customer gets something free; an added service that he does not pay for. The idea, "Service"—has been advertised and idealized by all lines of business from the junk dealer to governmental departments. These stories show that the sales departments are on the job and are developing their art. They are evidently giving the public the service it is entitled to when the burners are installed. The real service that the customer purchases, however, is furnished by the burner, which is the ultimate service the sales department has to offer.

If we think of an oil burner in terms of "Service" we realize that fuel oil does not burn by virtue of being fed into the furnace through a burner. The oil burns because the burner creates the proper conditions for the ignition and combustion of the oil. In a previous article[1] the writer discussed some of the conditions which a successful oil burner creates. A critical examination of the burner will show how well these conditions are met. The burner that does not create these conditions properly is the one that does not give service but is in need

(*Continued on page* 58)

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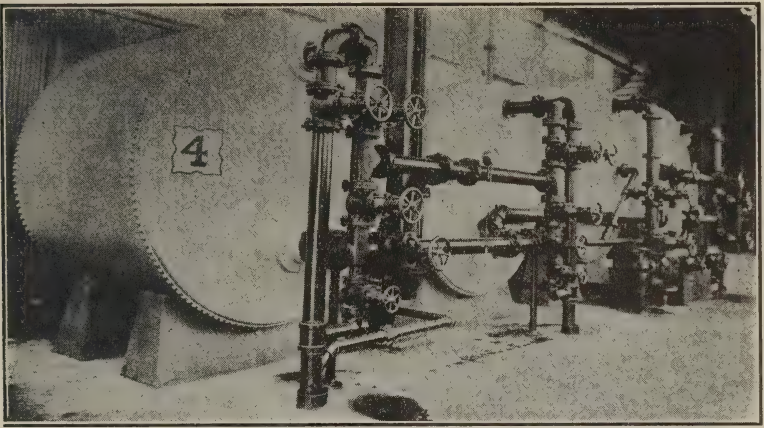
*Professor of Chemistry, Lombard College, Galesburg, Ill.

[1] Fuel Oil, Vol. 2, No. 9, page 21.



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Purifying Feed Water to Prevent Costly Boiler Scale

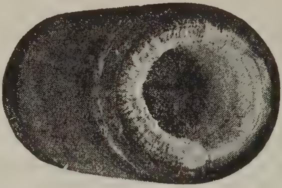
By Arthur G. Winkler

THE most common impurities found in the water supplied to industrial boilers are those which form boiler scale, a substance varying from a granite-like hardness to a soft crumbly chalk, and which is deposited, when the water is converted into steam, on all wetted surfaces in the boilers, condensers, pipes, etc., to which the heat is supplied.

The chemical constituents of scale are chiefly salts of magnesium and calcium, with additional impurities, such as iron, manganese, silica, etc. When it runs high in magnesium and calcium salts, it gets in its worst and most expensive work, for these are the best insulators known, and the scale deposition effects a considerable heat loss by insulating surfaces in the boiler that are especially intended to be heat transmitting.

Boiler tubes are frequently burnt out because of "hard" water and its attendant scale, particularly in plants using oil burners, due to the intensive heat concentration. Still another expense is in boiler cleanings and repairs, costly items which interfere with plant operation.

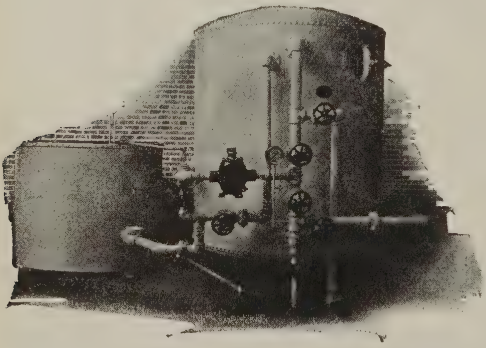
There are three general methods of eliminating the scale-forming impurities, and turning "hard" water into "soft." In the first of these the water is allowed to enter the boiler and is there purified. In the second it is purified while in the storage tank and in the third purification is accomplished by running the water through a mechanical purifier, or softener.



Boiler scale in a section of a hot water line

In the first method, soda ash or caustic soda or other boiler compounds are added to the water in the boiler and precipitate the impurities by a chemical reaction, after which they are blown out. Other types of compounds exert a mechanical action which prevents the concentration and cementation of the scale, and also allows it to be blown out. Tannin, graphite and slippery elm are examples of this type of compound.

In either case there is a disadvantage in allowing the impurities to enter the boiler at all, and the large amounts of hot water directed into the sewer by the "blowing-off" process represents a considerable loss.



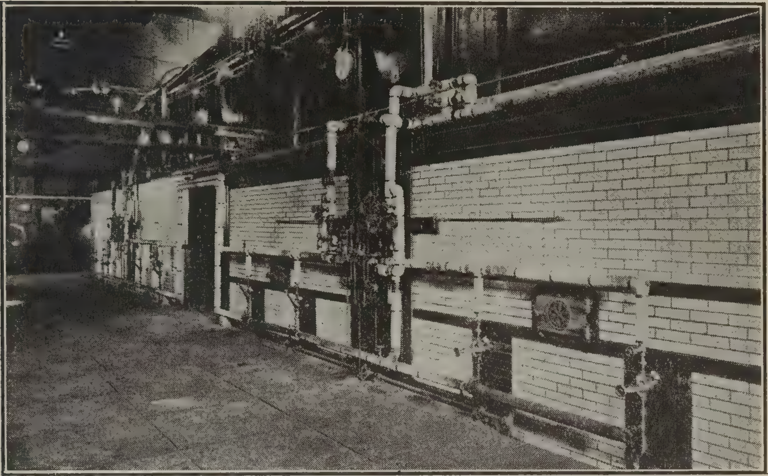
Typical zeolite water softener for boiler feed water, showing zeolite tank, brine tank and piping

In the second class of water softeners, known as the precipitating plants, the chemical used generally to eliminate the impurities are lime and soda. The process may be either continuous or intermittent. In the continuous process one tank is used, the charge enters by an inlet, settling as it flows and after filtering leaves at the outlet completely treated. The intermittent system requires several tanks. While the water is being treated in one the others are used as storage.

The third method is the zeolite process, in which the water is allowed to percolate through a bed of zeolite, a patented silicate, suitably distributed and supported in a closed or open container with valves and piping.

As the water passes through the bed of zeolite the hardness is removed by the commonly known zeolite exchange principle, the zeolite exchanging its sodium base for the calcium and magnesium bases in the water. When the zeolite softener is entirely utilized, as is indicated by a meter, the bed of zeolite is automatically regenerated by passing a solution of salt through the softener. By a reverse reaction the brine gives up its sodium base

(*Continued on page* 80)



Typical large industrial oil burner installation. This one consists of four Sterling boilers fired with steam atomizing burners and equipped with full automatic regulation, including damper controls. This is the boiler room of the Harvard Medical School, in Boston, Mass.

Heavy Fuel Oil Making Great Headway in Eastern States

By Harvey C. Dever*

THE tremendous progress made in the use of fuel oil as a substitute for coal has been one of the outstanding features in American industrial development during the last ten or twelve years. This change has been made in boiler plants of every type and size from that of the central station, factory, office building, hotel, apartment house, hospital, theater and school, down to the smaller plants such as are used in the private home.

On the Pacific Coast, the use of fuel oil has been the rule for a great many years, but along the Atlantic Coast and particularly in the cities from Portland, Me., to Washington, D. C., the most rapid strides have been made only within the past five or six years.

Succeeds Coal

The first installations were chiefly made in existing plants where coal had previously been burned, but

---

*First Vice-President, Petroleum Heat and Power Co., New York.

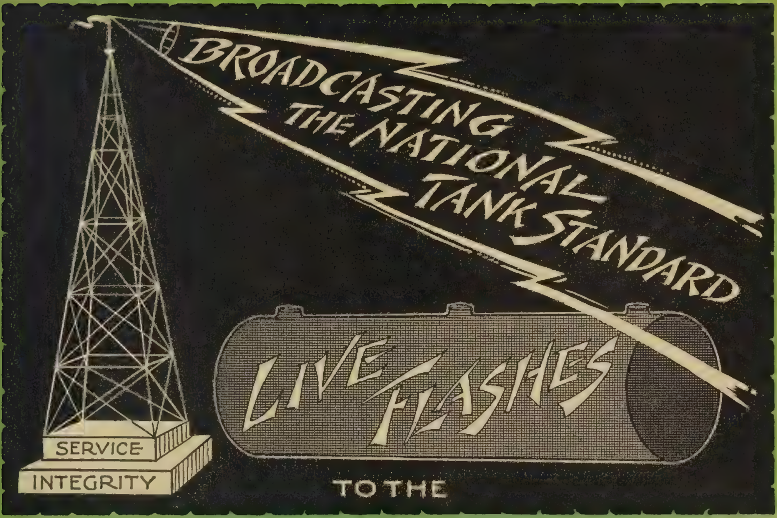
This photo was taken in a large boiler room in Providence, R. I., while coal was being used

today, and this is especially true in the cities of Boston and Providence, where oil has been used the longest along the Atlantic seaboard, all builders of large buildings are giving the question of oil very careful consideration. It has reached the point where in many instances, particularly with owners who have had previous experience with oil, oil burning equipment is included as a matter of course. Just here it is well to point out that the use of oil has long since passed the experimental stage and in fact when we consider the 15 years of wonderfully satisfactory experience that the Navy and the Merchant Marine has had, it is incredible that a few people still think of oil burning as an experiment and wonder whether there is going to be sufficient oil, etc. It is just as sensible as hesitating about buying an automobile for fear that there will be no more gasoline available within a few years.

New York City, which is usually first in adopting anything of superior merit and convenience, was somewhat slow in taking up the use of fuel oil, but after regulations making it possible to install plants were adopted about five years ago, conversions from coal to oil went ahead with great rapidity. It is significant to note that the nationally known Singer Building was first to adopt oil, followed

(*Continued on page* 50)

If you can't recognize it, this is the same plant pictured above after oil burners were installed


BROADCASTING THE NATIONAL TANK STANDARD
LIVE FLASHES
SERVICE
INTEGRITY
TO THE

Oil Burner Industry

JUNE PROGRAM - - - ENCORE

Our Program received with acclaim and gladly repeated.

Attractive Car Load Prices on:

550 Gallon 3/16″ Tanks

1000 Gallon 3/16″ Tanks

Basement Tanks **Gravity Tanks**

One or a Hundred - - Stock Shipment

Interesting literature for your convenience

CHICAGO STEEL TANK CO.

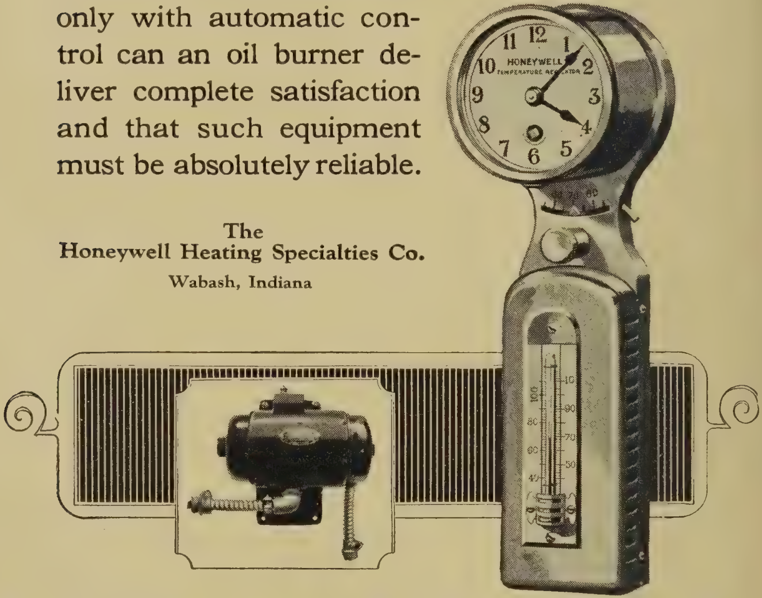
1301-13 SO. 55TH COURT

CICERO, SUBURB OF CHICAGO, ILL. PHONES LAWNDALE-0041 CICERO--8070

Leaders in the oil burner field are gladly taking advantage of Honeywell experience in the design and manufacture of quality Automatic Temperature Controls. They realize that only with automatic control can an oil burner deliver complete satisfaction and that such equipment must be absolutely reliable.

The
Honeywell Heating Specialties Co.
Wabash, Indiana

Honeywell Electric Motors and Switch Motors are approved and listed as standard by the Underwriters' Laboratories, Incorporated.



HONEYWELL

Temperature Regulators

The "10% Saving Over Any Other Burner" Folly

By Leod D. Decker

SINCE time without end a favorite stratagem of industrial oil-burner salesmen has been the saving "guarantee." Superintendents, chief engineers and purchasing agents alike are charged with reducing operating expense and a guarantee of savings in costs in any part of their plant is manna for the manufacturer.

Salesmen at Fault

Some burner manufacturers make the common and human weakness of plant owners or purchasing agents for any saving a source of sales for their burners. Their salesmen tell the prospect, who knows nothing of engineering, that their burner may be put in, a bond given to back up their guarantee, and a test run made for three months. If, after three months, the new burner is not satisfactory, they will take out their burner and install any equipment the owner or purchasing agent will choose.

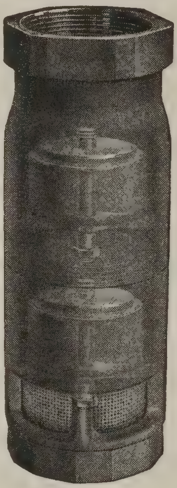
Such a sales policy is a gamble for the burner manufacturer. But it is one that, from various causes, he wins with often enough to make it lucrative. There is no denying that such a sales solicitation looks beautiful—on paper. It is so much better than anything a conservative and conscientious competitor will offer that the conservative burner manufacturers have learned to lessen their selling effort on any plant which has been tendered such an offer.

Zealous as men responsible for operations are for any operating saving, it is doubtful, however, if the practice of making guarantees of a fixed percentage of saving "over any other burner" may be charged directly to the purchaser of oil-burning equipment. Too often the blue sky "guarantee" is the closing appeal of a high pressure sales solicitation. It is used as a fitting climax by a salesman concerned more with a sale than with either fact or the economical operation of the prospective purchaser's plant.

"Guess and Multiply

"One of my earliest recollections in connection with oil burning," said the manufacturer of an internationally known oil burner, "is of an incident which occurred when I was first experimenting with oil, my object being to investigate various burners, all of the steam atomizing types, by the way, and furnace arrangements to obtain data which would be useful to my employers, who were boiler manufacturers. The information I secured was to be used in designing boilers and oil burning furnaces for their customers. This involved the investigation of different types of burners with a view of finding the most efficient for the service. I was running some boiler tests in New Orleans and suc-

Dependable Foot Valves
for
Fuel Oil Installations



PATENTED

Insure positive results with Moore and Kling foot valves. Made entirely of bronze valve metal. Carefully machined and hand-ground. Sediment chamber for each poppet.

Numerous sizes — single and double poppet construction. Write today for further details.

Moore & Kling, Inc.
233 Purchase St.
BOSTON MASS.

ceeded in obtaining some very excellent results in efficiency, an evaporation of about sixteen pounds being obtained with Beaumont oil, which at this time averaged more than 19,000 b.t.u.'s per pound. One day the agent of a well-known steam atomizer of the flat flame type came to see me, and without making any inquiry as to what results I was getting volunteered the information that he would "guarantee" to do 10 per cent better than I was then doing. I asked him what evaporation he would expect to get per pound of oil, in order to accomplish that result. He pondered with great care. (I think his mental processes might be explained by the old saying, 'Guess at a quarter and multiply by four'), and then said he would get an evaporation of 15.87. I inquired if he meant actual conditions or from and at 212 degrees. He replied that he couldn't do it at actual conditions, of course, that he meant from and at 212 degrees.

Extravagant Promises

"Unfortunately this exemplifies the state of mind of too many men selling oil burners. Instead of showing a prospective buyer mechanical advantages concerning the economy and ease of cleaning and repairing their equipment, they promise 'better results than any other burner in the world.' Over-anxiety forces on a prospective buyer guarantees that he neither demands nor expects."

Such guarantees are not always confined to 10 per cent. A case was recently reported of an excellent burner being sold on a flat guarantee of 25 per cent saving. It seems sufficiently plain that the factors affecting the saving any burner may make are varied, and in almost every case beyond the control of the burner manufacturer and his engineers that casual analysis on the part of the purchaser would make him proof against the blue sky "guarantee." Any burner of average design may be able to make a saving over another burner if, as is often the case, the other burner is being poorly operated. With installations of this sort the man with the big guarantee repairs the brickwork of the furnace, plugs up the air leaks, stays with the installation for a week or two, carefully watching the operation of his burner every minute, and shows a substantial saving to the owner. But he is supplying a combination of supervising and consulting engineering that is often dearly bought in the price of the equipment that must be scrapped.

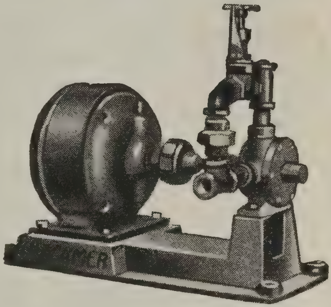
Different Guarantees

Frequently the "guarantee" is made on a basis of the boiler efficiency, and in such cases the burner manufacturer undertakes to guarantee the performance and efficiency of equipment he does not sell and may even know nothing about. Only because the average owner of an oil burning plant is entirely uninformed on the most important factors of combustion engineering does the practice of selling such guarantees flourish as it does.

To the thoughtful plant owner or prospective purchaser of oil burners it will be obvious that all the burner manufacturer may rightly be held responsible for is the actual

(*Continued on page* 70)

BLACKMER
ROTARY PUMPS



The New BLACKMER
---Model 13 Fuel Oil Pump

Embodying the well known Blackmer Principle of automatic-take-up-for-wear, the Blackmer Model 13 Fuel Oil Pump is a rotary pump especially suited to domestic and industrial fuel oil use.

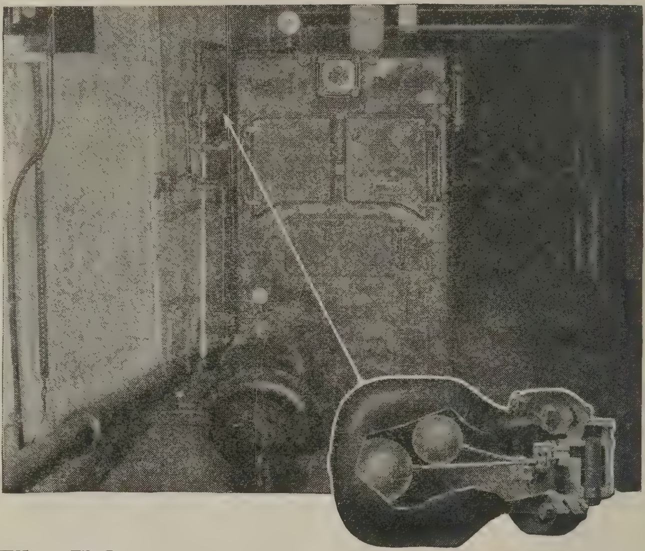
BLACKMER
Model 13 Fuel Oil Pump

has a capacity up to 3 G.P.M. Equipped when desired with by-pass having needle-valve control, insuring uniform delivery of fuel.

While the unit shown above is direct connected to a ⅛ H.P., 850 R.P.M. electric motor, we are prepared to furnish the pump with standard speed motor and gearing, or arranged for belt drive. For customers who wish to mount this pump integral with their own equipment, we will furnish the bare pump.

Our engineers will gladly consult with you on any pumping problem. Write for detailed literature about Model 13.

BLACKMER ROTARY PUMP Co.
Petoskey, Mich.
Branches in nineteen principal cities



Why Take a Chance?

Low water is expensive because it means burned boilers and cracked sections.

With a McDonnell & Miller Duplex Water Feeder on the boiler, you KNOW there is plenty of water. You also KNOW there is never too much, for the McDonnell & Miller Duplex Water Feeder absolutely maintains the boiler water line where it should be.

"Convenience" is the outstanding argument for oil burners. The McDonnell & Miller Duplex Water Feeder completes this argument and makes "convenience" entirely dependable.

We would like to tell you why. Send for our bulletin, F-1.

McDONNELL & MILLER

"Doing One Thing Well"

Wrigley Bldg. WATER FEEDER Chicago

Analysis of Oil Flames

By JAMES L. BREESE, JR.

Continued from May Issue

NEXT, take the gas-jet. We find that if a relatively large amount of gas comes out of a round hole at low velocity, the gas flame will smoke. However, if we have two openings at 90 deg. to each other, so that the two jets impinge and give us a relatively large exposed surface, the gas will burn without smoke. This is the common type of flat flame gas jet. Here we have conditions different from the log of wood. Instead of moving the air rapidly over the surface of the gas generator, which was the log of wood, we move the gas at high velocity through the air and give it a large exposed surface to the oxygen of the air. In order to find the velocity of the flame propagation of this gas, it is merely necessary to allow the gas to escape from a small streamlined orifice of even diameter, and increase the pressure at the orifice until the flame leaves this point. Ordinary city gas has an average tip velocity of five or six thousand feet per minute, and the flame will leave the tip at this velocity. We are beginning to get some data. Now turn to a highly specialized form of flame, and see what we can discover there. I refer to the oxy-acetylene blow torch. Here we have a flame no larger than a dining room table candle flame, but producing many times as much heat, and a much higher temperature. We find here that the velocity at which the gas and oxygen can be sent from the nozzle without the flame leaving the tip is all out of proportion with what we found in the first two cases. Why is this? The answer is that the velocity of flame propagation is a function of temperature, and the reason for producing a higher temperature by the use of pure oxygen, is from the fact that no nitrogen has to be heated and that the entire heat of combustion is produced in the cone of mixed oxygen and hydro-carbon. We also find from the acetylene torch that the blue flame gives a higher temperature, whereas a yellow flame gives more radiant heat.

Heat Generation the Same

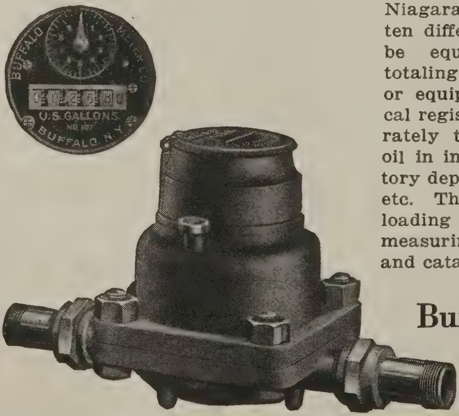
The total amount of heat generated is the same, and that in the design of our final burner, the decision as to whether we will have the blue flame, or a yellow flame, is largely a matter of the application of that flame. We now have enough data to analyze the flame produced by our burner to see whether or not we are accomplishing the results for which we designed the structure.

Suppose we have in mind a blue flame burner. To obtain a blue flame, we have found that it is necessary to premix the oil gas with air. We know the temperature of saturated oil vapor, and we know the cracking temperature of this vapor. So the problem is merely to arrange mechanical means for producing and mixing the oil vapor and air between these two temperatures, bearing in mind that as we increase the temperature beyond the minimum temperature of saturation, our flame propagation velocity will increase, and in order to keep the flame from burning back into the mixing chamber, tip velocities must be kept above the velocity of flame propagation for the particular mixture and temperature chosen. This is usually done by using a large number of small apertures to give the air surface necessary. This type of flame is well adapted to boilers with small flue passages, and applications, such as melting pots, where high temperature and relatively small surfaces are available for heat absorption. Owing to the fact that the flame propagation is a function of the temperature, and also to the proportion of air and oil gas in the primary mixture, the proportions of such a burner must be carefully calculated, and for this same reason a small range between high and low setting will exist.

Yellow Flame Burner

The yellow flame burner is more generally adapted to all classes of work, except melting pots, and is therefore the type usually attempted. Let us review the data we have obtained, and now construct our yellow flame burner. First of all the data from the log of wood have to be thrown out, as this presupposes a primary mix-

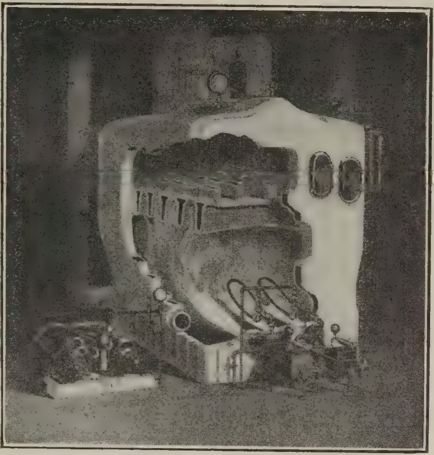
NIAGARA OIL METERS



Niagara Oil Meters are made in ten different pipe sizes and may be equipped with horizontal totaling register like shown here or equipped with a large vertical register. They measure accurately the consumption of fuel oil in individual burners, in factory departments, Diesel engines, etc. They are also used for unloading tank cars and other measuring of oil in bulk. Prices and catalog mailed upon request.

Buffalo Meter Co.
2926 Main St.
Buffalo, New York

Listed
as standard
by Fire
Under-
writers
Laboratories



Approved
by
New York
Fire
Department
Board of
Standards
and Appeals

Dealers!

Why not show good profits?

You can do more business with Caloroil Burners. Why?

Our dealers are making sales!

Every installation brings us a letter telling about ***actual savings*** in operation and general satisfaction with Caloroil Burners!

Because you won't have to service them continually and will therefore eliminate the largest item in your overhead. The product of our five years of experience in domestic oil burning is an oil burner which makes the word "servicing" almost obsolete. In actual tests—but let us give you this information confidentially. Just send us a note and we'll be glad to tell you anything you want to know about Caloroil Burners and show you letters from users who are making big savings in their fuel costs.

Caloroil Burners are thermostatically controlled; automatic; simply and quickly installed; easily regulated and understood; made in standard sizes to handle boilers of any capacity; cause no carbon, smoke or odor; use 28° Baume Gravity Oil; and have a special vacuum oil feed system—neither force feed nor gravity.

Remember to write for more information

Caloroil Burner Corporation

7 E. 40th Street **New York City**

Titeflex

REG. U. S. PAT. OFF.

Titeflex All Metal Tubing for Oil Burner Equipment

It Is Flexible

IT ABSORBS VIBRATION

It Has No Packed Sliding Joints

It Is All Metal

It Is Safe

THE TITEFLEX METAL HOSE CO.

NEWARK, N. J.

ture of hydro-carbon and oxygen, but we can supply what we learned from the candle and the acetylene torch. We have decided how much heat we wish to produce in a given time. We therefore know the amount of liquid fuel to be fed. From this we know the amount of air necessary for complete combustion. We must decide on the amount of space available for this combustion, and from this we can calculate the velocity at which the air is to be delivered. If we wish to make use of the radiant heat of the flame, as for instance in stoves and hot air furnaces, the shape of the flame is of prime importance, as the radiant heat, which amounts to about 30 per cent, is emitted from the surface of the flame and in a direction normal to the surface. Therefore, if we have a cylindrical surface to heat, we should produce a cylindrical shaped flame surface, the shape of a flame being determined by the shape of the outside surface of the oil gas produced. This shape may be controlled by the direction and velocity of the liquid oil, as well as by the direction and velocity of the impinging air. In fact the resultant of these two velocities is the final shape. As all the mixing of the oxygen and hydro-carbon must be made along the surface between the air and the outer surface of the oil gas, it is essential that we provide means for as large a surface as possible, and further means for keeping the oil gas up to the ignition point until the reaction between the hydrocarbon and oxygen is completed.

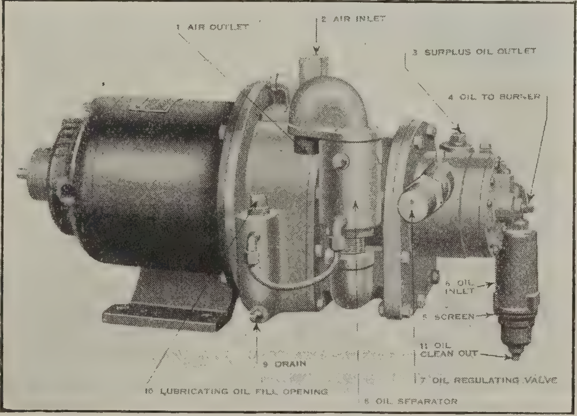
All In One Unit

1. **Motor**
2. **Air Blower**
3. **Oil Pump**
4. **Oil Pressure Regulating Valve**
5. **Positively Regulated Non-Clogging Oil Feed**
6. **Automatic Lubricating System**
7. **Fuel Oil Screen**

The new Teesdale Air Blower Oil Pump Unit, containing the features listed above, is finished complete and ready to be incorporated into any automatic forced draft oil burner without further adjustments.

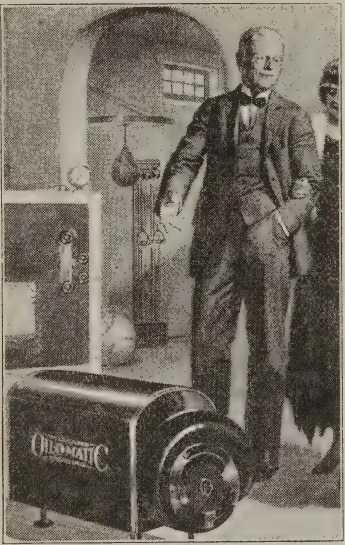
It is designed to give reliable, efficient service *noiselessly.* All bearings are of bronze and the pump and blower are mounted on one shaft. Each machine is proved durable and sturdy by a long running test before it leaves our factory.

Burner manufacturers can now dispense with the pump and blower problem. We can supply these units, as shown, in any quantity, or can alter to suit manufacturer's requirements.



We also build high vacuum oil pumps for oil burners. Send for descriptive circulars, stating your requirements.

Teesdale Manufacturing Company
427 Market Street **Grand Rapids, Michigan**



SETS NEW RECORD

On Low Service Cost

OIL-O-MATIC, the remarkable new-type oil burner, by actual test, requires less servicing than a high grade washing machine. One service call for each 104 hours of running time was the best any electric washer could show. OIL-O-MATIC operated 1050 hours, ten times as long, with only three service calls. Two of those calls were for trouble not in the burner. The third was for a minor adjustment.

Get full information on the oil burner that has solved the burner problem. Some desirable territory still open for live dealers. Write today.

C. U. WILLIAMS & SON

Main Office and Plant
Bloomington, Ill.
Branches in all leading cities.

WILLIAMS OIL-O-MATIC HEATING

Various means will at once be apparent, such as using a fire brick target, or bringing the tail of the flame around the initial ignition point, thus using the heat from the hydrogen a second time, or by setting up eddy currents with the forced air. Noise will occur, however, wherever air is admitted at a velocity greater than the rate of the flame propagation for the particular mixture and temperature. Smoke will occur wherever the incandescent carbon is allowed to cool down below the ignition point, either from the admitting of too much air, which will chill the carbon, or insufficient air, which allows to travel too far below, meeting its oxygen affinity.

Much as we pride ourselves on our ability to see, our eyes are sensitive only to a small portion of the light, or vibrations constantly flooding the world. Stretching on both sides of the small portion of the spectrum that we can see, are great ranges of vibrations that, while invisible, vitally affect us and our work. Visible light ranging from the violet with a wave-length of 16 millionths of an inch to deep red with a wave-length of 28 millionths of an inch, occupies only an octave of the spectrum of these vibrations.

Ultra Violet Rays

Shorter than visible light are the ultra-violet rays with wave-lengths from a millionth to 16 millionths of an inch. These rays affect photographic plates, and in fact, much of the image in ordinary negatives is due to these rays,

(*Continued on page* 62)

THIS COURT
Must Pass on Your Product

—Before your oil burning apparatus goes into a home, it must pass this court of domestic opinion, which rates simplicity and dependability so high. Jefferson equipment for electrical ignition and supply of current for control systems make these requirements your strongest selling points. Technical knowledge and constant attention become unnecessary.

The Jefferson Coil delivers an intensely hot spark which gives positive and instantaneous ignition to gas pilot or to fuel direct. Jefferson Transformers are everlastingly reliable in furnishing power for thermostatic and relay mechanism, controlling temperatures—together, a fully-perfected system for control and ignition of oil burners. Standard equipment on most oil burners today because they clinch the arguments of dependability—economy—convenience—safety.

Our engineers will gladly study your requirements and design suitable equipment.

Makers of Jefferson Radio Tube Rejuvenators; Radio, Bell Ringing and Toy Transformers; Jefferson Spark Coils for Automobile, Stationary and Marine Engines; Jefferson Oil Burner Ignition Coils and Transformers.

Jefferson Electric Mfg. Co.
501 S. Green St. Chicago, Ill.

The Basel Valves and Heat Regulators

are now patented. Why? Because they are not just ordinary valves. They mean advanced theories in valves and valve control construction for Gravity and Mechanical burners.

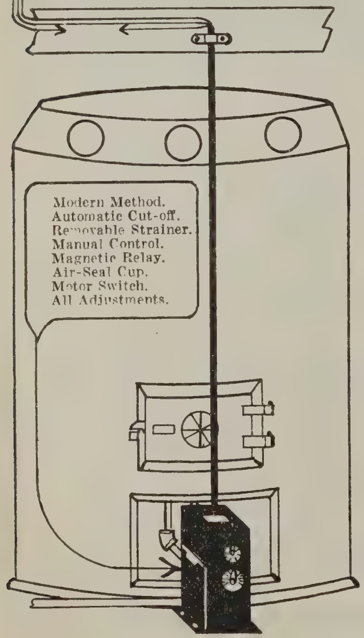
Manufactured in ten types.

Type A-2 listed as standard by Underwriters' Laboratories, in three phases, Manual control, Manual and Remote control, and Manual, Remote with Retarding element.

This cut shows our E-2 Heat Regulator, complete with thermostat. Valves and valve control is our hobby.

Literature on request.

Basel Manufacturing Co.
911 Mulberry St., Kansas City, Mo.



Modern Method.
Automatic Cut-off.
Removable Strainer.
Manual Control.
Magnetic Relay.
Air-Seal Cup.
Motor Switch.
All Adjustments.

Slight Revisions in Electrical Equipment Rules

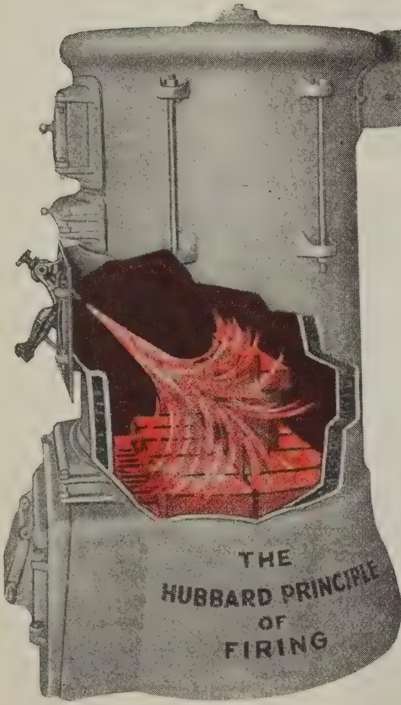
Few changes were made in the tentative underwriters' requirements covering electrical features of burners, at the meeting of burner manufacturers, equipment men and underwriters' representatives in Chicago, May 1.

Rule 85 was changed to read that "wiring, where not otherwise inclosed in metal, be inclosed in approved conduit or its equivalent" and that "standard outlet boxes or fittings be provided when either the voltage exceeds 25 or the power supply exceeds 50 W."

Rule 86 was made to specify that there be no exposed live metal parts carrying current. Electrical contact in safety apparatus was covered in Rule 87, which specified that they be of a size and material that will allow them to give continuous service without appreciable change of form due to making and breaking of the circuit, and that burner controls shall allow the operation of the burner only when the control circuit is closed. Minor revisions were also made in Rule 88 covering control appliances.

Walter Williams, of the Williams Oil-O-Matic Heating Company, represented the American Oil Burner Association at the meeting. Other burner manufacturers' representatives present were: Phil Russell, Home Appliance Corporation; A. P. Hitzman, Wayne Tank and Pump Company; and J. G. O'Connor, Gilbert and Barker. Practically every control manufacturer was represented also.

Send for Literature
on
The Hubbard Automatic
Oil Burner
Vacuum Type



HUBBARD OIL BURNER

**1125 Nicollet
Ave.,**

**Minneapolis,
Minn.**

NATIONAL AIROIL BURNER

Airoil Burners
"are efficient"

The Complete Design
and Installation of
Oil Burning Systems

**National
Airoil Burner Co.**
916 Thompson Street
Philadelphia

WE SPECIALIZE
IN
**FUEL OILS
GAS OILS**
FOR DOMESTIC OR
INDUSTRIAL PLANTS

DELIVERED EITHER IN
TANK TRUCKS OR
TANK CARS

"CAN MAKE IMMEDIATE DELIVERY FROM OUR REFINERY"

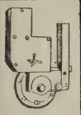
OHIO REFINING COMPANY
TELEPHONE RIDGE 884
CINCINNATI, OHIO

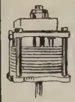
Chalmers Aiding Control Standardization

Due to the efforts of C. H. Chalmers, president of the American Oil Burner Association, attempts are being made by the Association and the temperature control manufacturers to standardize temperature controls by uniform numbering of the terminals and binding posts on the various attachments and devices so that no incorrect connections will be made. It was at first suggested that a standardization of colors, both in wire conductors and terminals, would answer, but it did not seem practicable to stress such change, due to the large amount of apparatus and literature the manufacturers now have out, which would necessitate much trouble and work to change. Under Mr. Chalmer's plan, however, the color combinations now in use will be kept and the numbers added, to simplify and standardize all control equipment.

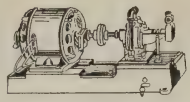
St. Louis Passes Oil Burner Ordinance

On April 3, the recently enacted oil burner ordinance for St. Louis, brought about by the fact that several fires had occurred in that city from the lack of proper safety devices, became effective. The ordinance covers the issuance of permits for oil burning installations, definitions of oil burners and fuel oil, regulations for the installation and construction of oil burning equipment, and rules concerning safety devices and practices. It was drawn up by the St. Louis Safety Council's Fire Prevention Committee.


GAS PILOT CONTROL

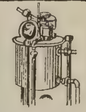

OIL FEED SAFETY VALVE

OIL STRAINER


AIR AND OIL PUMP MOTOR UNIT SELF LUBRICATING NOISELESS

NON-CLOG OIL BURNER

OIL TANK FOOT VALVE


AUTOMATIC AUXILLIARY TANK

The air and oil pump motor units, in 8 sizes, furnish air for proper combustion and propels the oil from tank to burner as needed.

Outfit shown is for domestic work up to about 12 or 14 rooms.

The gas pilot control shuts off the oil should the gas supply fail. It also insures unfailing ignition of the oil in the furnace.

The oil feed Safety Valve stops the flow of oil automatically should the outfit become deranged, the operating electric current fail, or the gas supply stop.

The oil strainer removes dirt preventing clogging of the burner or other parts.

The burner is a perfect vaporizer, utilizing the heat units of the oil to the limit. A domestic and a commercial size.

The oil tank foot valve prevents the oil running back out of the pipe into the tank when the pump stops.

The automatic auxiliary tank takes the place of hand pumping from outside to inside storage tank.

These parts will work with other makes of burners. If you are having trouble with your present pumps or parts—write us.

**For
Proper
Fuel
Oil
Atomizing
and
Heating**

Leiman Bros., 60-F65 Lispenard St., New York

Makers of Good Machinery for 35 Years

Fuel Oil Markets

Large Output of Heavy Fuel Oil Brings Price Reductions

SMACKOVER'S mounting production of heavy fuel and the normal spring slackening in demand joined to make the fuel oil market a decidedly inviting one for buyers since the first of the month, though a very weak one from the standpoint of the refiners.

Smackover heavy oil output rose from below 300,000 barrels daily to well over 350,000 barrels daily during the first half of the month and resulted in large quantities of heavy untreated fuel oil flooding the mid-western markets. It was offered as low as 75 cents a barrel on the Chicago market and treated oil slipped off to 90 and 95 cents. Gulf Coast heavy fuel oil, under the pressure from Smackover's large supply, dropped to $1.45 and $1.50 a barrel.

Deliveries of heavy treated fuel were being made to consumers in New York City at 4½ cents, with bunker oil quoted at $1.70, following a 5-cent drop on April 30. Further reductions were expected before June 1.

Kerosene, distillates and gas oils were in fair demand for this season of the year and there were no radical price changes during the first half of the month. The distillate demand is always very light at this time of the year and refiners are prepared for the reduction. Tank wagon price of furnace oil in New York on May 18 was 10 cents, at which figure it had been since the first of the month.

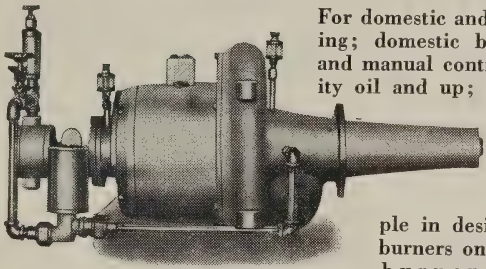
California prices have been very steady for the last month, heavy oil staying between $1.60 and $1.65 f.o.b. refinery.

No Reverting to Coal

If there had been any of the movement back to coal that the coal dealers in the West have been shouting about, it was checked this month, according to reports from the Mid-continent. In fact, there were increasing demands for oil from industrial plants, adequately offsetting the decrease caused by the cessation in buying among hotels, apartment houses and similar buildings where it was consumed for heating purposes only.

Household demand, of course, is quite dead, having entered upon its summer inactivity. There has been more attempts at early selling and "laying in" by marketers this year than ever before, but the burner owners, seeing three or four months

MANNING OIL BURNERS



For domestic and commercial heating; domestic burners, automatic and manual control using 22 gravity oil and up; commercial burners, automatic and manual control using 14 gravity oil and up; very simple in design; best finished burners on the market. All burners are polished aluminum.

Dealers Wanted. Send for Literature.

MANNING MFG. COMPANY

407 Market St. San Francisco, Cal.

GOULDS

Hand Rotary Pump for Fuel Oil Systems

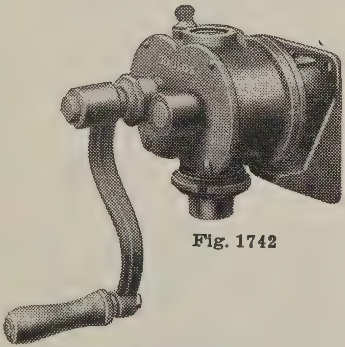


Fig. 1742

Designed and built especially for transferring oil from outside storage tank to the inside gravity tank in connection with Domestic Oil Burning Systems.

Fitted with special surface and gland packings.

Furnished with or without bracket for attaching pump to side wall.

Capacity—10 gallons per minute.

Ask Us for Special Quantity Prices

THE GOULDS MFG. CO. **Seneca Falls, N. Y.**

Atlanta Chicago New York Pittsburgh
Boston Houston Philadelphia Washington

ahead in which to stock up for the first cold spell of next winter, are loath to buy.

Reductions in both heavy and light oils are to be expected in the next two months, especially in the Middle West.

Prices, tank car lots, f.o.b. Group 3 refineries, on May 18, were as follows:

Fuel Oil 24-26	.85	to .90
Fuel Oil 26-26	.90	to .95
Gas Oil 32-36	.02¾	to .03⅛
Distillate 36-38	.03	to .03⅛
Distillate 38-40	.03⅛	to .03¼
Kerosene 41-42	.04⅛	to .04½
Kerosene 42-44	.04½	to .04¾

Organizing Refractories Institute

Tentative plans have been made for the organization of the American Refractories Institute to provide a satisfactory contact between all industries that use and manufacture refractories, according to MacDonald C. Booze, who holds the Multiple Industrial Fellowship on Refractories, Mellon Institute of Industrial Research, Pittsburgh, Pa., who has been appointed temporary secretary of the organizing committee.

City of New York Installing Burners

Oil burners are now being installed in the Municipal Building, New York City, according to an announcement by the Petroleum Heat and Power Company. The work entails the conversion of two 300-h.p. and one 150-h.p. B. & W. Boilers, and the installation of two burners under each.

TIGHT TANKS

Immediate Shipment

From Warehouses Near You

THE LINDEMANN CO.
50 CHURCH ST.
NEW YORK CITY

Warehouses:
Boston, Hartford, New York,
Newark, Philadelphia, Balto.

Breese Burnoil Boilers

have been used all over the country since 1921

The *original* boiler *designed* for exclusive use with oil or gas burners

Designed for a purpose, it is not a makeshift adaptation. It is efficient because of proper application of heating principles. Oil Burner dealers who recommend this tried boiler find their installations more satisfactory. Territory is still open. We want live representation. Bulletin A2 has interesting information

BREESE ENGINEERING CORPORATION
431 East Ohio St. Chicago, Ill.

A Perfected Fuel Oil Burner

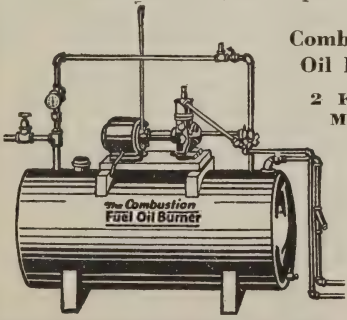
Backed by six years' experience. First one installed at Glencoe, Ill., in 1919 still giving perfect satisfaction.

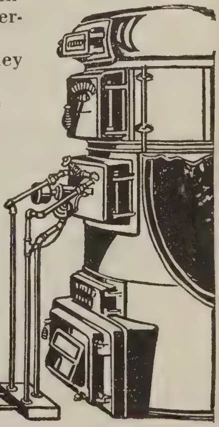
Many heating contractors have made money selling them.

Some Territory still open. Wire or write

Combustion Fuel
Oil Burner Co.

2 Keefe Ave.
Milwaukee





Permanent Satisfactory Service

That is another one of the reasons why Chalmers Oil Burners enjoy the popularity they do today.

Every feature built up from standardized units, and backed up by our guarantee, Chalmers Oil Burners have earned a reputation that no amount of money could buy.

To become affiliated with this organization as a Chalmers Agent offers a substantial profitable proposition to the right man.

Correspondence with substantial parties looking to permanent affiliations is solicited.

Chalmers Oil Burner Co.
Minneapolis Minnesota
Member of American Association of Oil Burner Manufacturers

Quality Oil Pumps

HAND or POWER

We Can Fit
Our Designs
to Your Needs

Send Us Your Pump Problems

Columbia Industrial Machinery Co.
4020 W. Lake St.
CHICAGO

Babson Reports Fuel Oil Future Promising

Advice to its clients to sell their coal securities and buy oil securities occupied a prominent place in one of Babson's Reports, issued recently by the Oil Statistics Company, Babson Park, Mass.

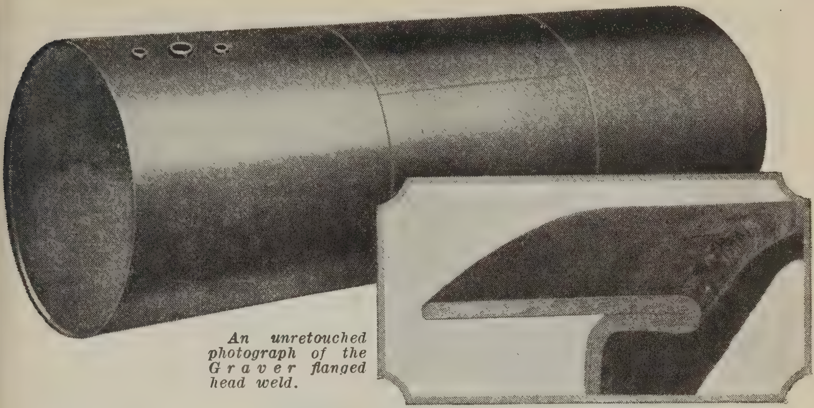
It stated that after watching the bituminous situation and hoping for an improvement, the company believes that the difficulties faced by the bituminous coal industry are too great, citing difficulty of operation and labor troubles as obstacles to steady production.

"In view of the above situation," the reports states, "we believe that clients who are now holding coal stocks will do better by changing to some of the other stocks we have recommended. . . .

"The reason we prefer stocks of the stronger oil and power companies is that these two industries have a promising fundamental outlook. Compared with the position of the coal industry the stronger oil and electric light and power companies have distinct advantages. The use of oil seems bound to increase as the oil burning equipment is perfected. We expect to see a great expansion in the use of oil in both factories and dwelling houses. . . . We, therefore, advise clients to change their coal stocks into good oils which we have previously recommended. . . ."

Large Attendance at Oil-O-Matic Convention

More than 1000 dealers and salesmen attended the national conven-



An unretouched photograph of the Graver flanged head weld.

No leaks and *extra* rigidity with Graver Flanged Inverted Head

This construction, as illustrated, overcomes the shearing stresses that are present at the junction of the heads to the side walls. The welded double-thick joint forms a supporting rib that holds the tank end rigid.

In addition, the flange permits an actual fusing of the head joint instead of the "soldered" type weld that is necessary with the more common construction.

This is but one of the many features of Graver Tanks. We make prompt shipments of standard sizes—ALSO there are exceptionally attractive prices on quantity lots —Write for prices.

GRAVER *Corporation*

(WM. GRAVER TANK WORKS—FOUNDED 1857)

Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment

160 Todd Avenue, East Chicago, Ind.
New York Chicago Tulsa Houston

Please mention Fuel Oil when writing advertisers.

One Prospect
Two Sales
Double Profits!

Oil Burner Dealers!—Why be satisfied with one profit when you can easily make two? People who install oil burners in their modern homes are logical "prospects" for the Home Incinerator. It means a clean basement, puts an end to boxes and barrels of old paper, rags, all kinds of trash that litters up premises.

The Home Incinerator also means a sanitary yard. It does away with the messy rubbish barrel and the filthy garbage can — burns garbage and rubbish completely without smoke or odor. Portable type, easily installed, convenient elbow height. Scientifically constructed — simple, economical in operation. Servicing practically nil—a clear profit on every sale.

Write Today for Specifications and Prices

Home Incinerator Co.
Milwaukee, Wisconsin

The Home Incinerator

tion of the C. U. Williams & Son Oil-O-Matic Corporation, held in Bloomington, Ill., May 11 and 12. A lengthy and interesting program was presented, beginning on the morning of the 11th, with an address by C. U. Williams, president of the corporation, and ending on the evening of the 12th, with a speech by David R. Forgan, Chicago banker.

Others on the program were: Walter W. Williams and G. J. Scanlan, both members of the Williams organization; J. W. Owens of the Federal Gauge Company, Chicago; E. J. Smith of the Underwriters' Laboratory, Chicago; H. D. Linn, American Radiator Company, Chicago; R. G. Henderson, vice-president, Blair & Company, New York; G. B. Geiger, Peoria; Leroy A. Kling, Kling-Gibson Advertising Company, Chicago, and many Williams dealers from all sections of the country.

Meetings were held in the new Williams factory building. Most of the speeches were on technical topics and phases of dealer salesmanship and agency management. Several new members were taken into the 100-a-Month Club, which limits its membership to those Williams dealers who succeed in selling more than 100 burners in a single month.

Have New Blue Flame Burner

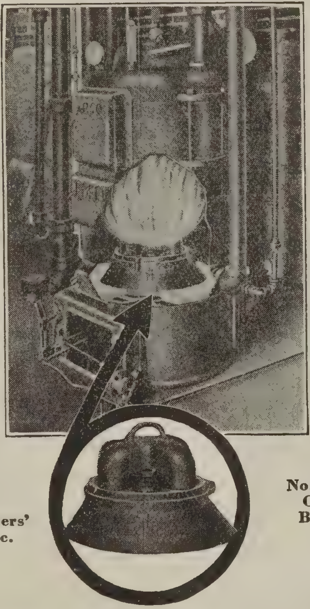
Johnson Oil Heating Company of Newark, N. J., recently placed a new type of natural draft burner on the market. It has a special air carburetting device for the production of a blue white flame.

A Real Dealer Opportunity!

Many home owners still believe the advantages of a *good* oil burner are not theirs to enjoy without a price penalty. But that's what makes the field for the Oliver so large. The price is low. You have less money tied up in stock. Quicker turnover. A *profitable* business. It's an interesting story. May we tell it in a letter?

OLIVER
OIL-GAS BURNER

Simplicity of design and adherence to natural, scientific principles, backed by 14 years' experience, have resulted in the development of this high-efficiency oil burner that's easy to install and operate. A burner you can recommend and back.



There's an Oliver Oil-Gas Burner for nearly every type and size of heating plant—for large homes and small. No sales lost by not having the right burner for the particular situation. Gravity type. Natural draft.

Listed as
STANDARD
by the Underwriters'
Laboratories, Inc.

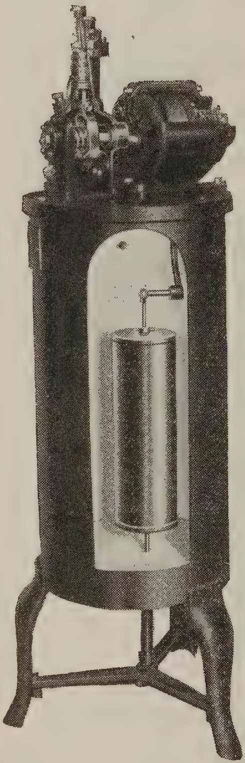
No. 30-A
Oliver
Burner

THE OLIVER OIL BURNER CORPORATION

664 Oliver Bldg., St. Louis, Mo.

Oldest and Largest Manufacturers of Oil-Gas Burners in the World

Monroe Oil Pump



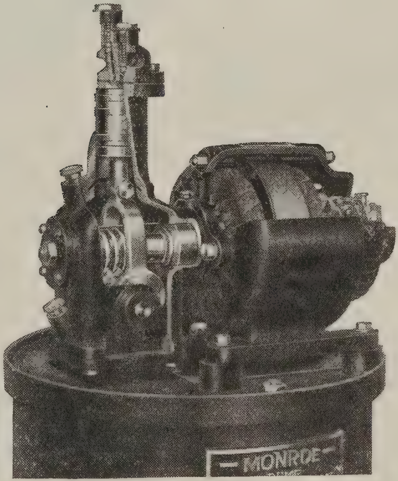
Sectional view of Monroe Pump showing float and cylinder head.

—Install it and Forget about it!

The man who is modern enough to install an oil burner is the man who wants the Monroe Pump. He is the type who is not satisfied with "good enough."

Show him—let him see for himself. Enthusiasm everywhere—unbounded enthusiasm. The returns on the Monroe Pump are rolling in. Dealers are reporting that every one who sees it wants one on the spot.

Human Distinction



Sectional view of Monroe Pump and Janette Repulsion-Induction motors.

Dealers:—

We can only hint in this space the possibilities of the Monroe Pump and its remarkable construction. It is the heart of your installation. It governs your maintenance to a minimum. Let this silent watchman win satisfaction amongst your users. Look over the above illustrations and write for our Dealer's proposition.

MONROE MACHINE TOOL CO.
737 W. Jackson Blvd., Chicago, Ill.

Record Fuel and Gas Oil Production in March

Record production of fuel and gas oils during March was reported to the Bureau of Mines by 294 refineries operating throughout the United States. The total for the month was 1,204,000,000 gallons, a daily output of 38,835,665 gallons. This total was an increase of 145,000,000 gallons over February, and of 90,000,000 over March of 1924.

Imports during March reached a total of 55,319,508 gallons, which was 235,000 gallons less than February's total and about 7,000,000 gallons more than the figure for March last year. Exports rose to 132,571,333 gallons, as compared with 109,457,541 gallons in February and 134,973,335 gallons for March, 1924. According to a recent report of the U. S. Chamber of Commerce, total gas and fuel oil exports for the year 1924 were 1,438,000,000 gallons, which was a 17 per cent increase over 1923.

Stocks on hand rose about 8,000,000 gallons during the month and totaled 1,647,523,327 gallons, or 46 days' supply. The stocks on hand on the corresponding date last year were 1,487,463,907 gallons, about 44 days' supply.

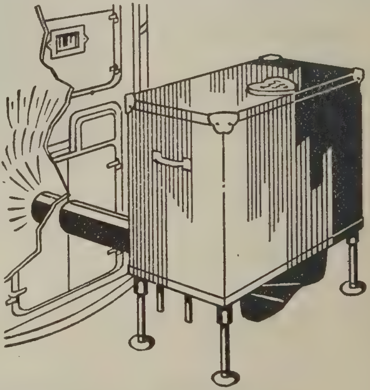
Domestic demand, due to the cool weather in March, totaled 1,118,235,489 gallons, as compared with 989,404,932 gallons in February. The daily average was about 36,000,000 gallons, compared to 34,000,000 gallons in February. Domestic demand a year ago averaged about 33,000,000 gallons daily and totaled 1,031,767,019 gallons in March.

HART
The Perfected Oil Burner

When Hart heat is at work on the job, building owners know their heating problems are solved for all time. Hart Oil Burners are of proved merit and always make good on every claim made for them. Because of greater distribution and tremendous demand for these burners it has become necessary to increase our factory to three times its present size.

From a standpoint of safety and economy Hart Oil Burners are in a class by themselves.

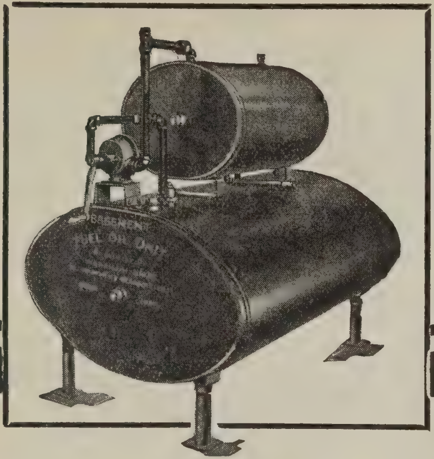
Write us for detailed information.



Hart Oil Burner Co.

"HART HEAT"

Department 101 **Peoria, Ill.**



Price Complete..	$120
Magnetic Gauge..	5
Pumps	16

Complete Fuel Oil Tank Unit Installed in Basement

The most approved method of installing the fuel oil tank in many communities is right in the basement. This Morrison unit is usually specified. Conforms to every Underwriters' Laboratory regulation. Perfectly safe. Oval shaped 250-gal. supply tank clears the basement door. Above is assembled a 50-gal. auxiliary tank with hand piston pump, overflow pipe and measuring gauges.

Best 14-gauge, blacksteel and careful building make these tanks durable and leakproof. Investigate. Write for special literature.

We also supply the oil distributing trade with a complete line of oil equipment including truck tanks, above and underground tanks, brass goods, pumps, etc. Send for prices.

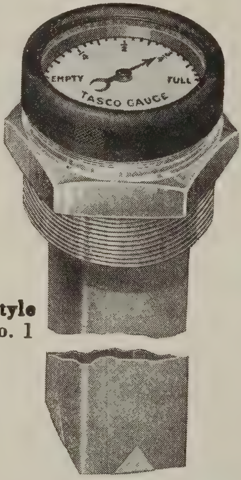
Morrison Bros.

"OIL EQUIPMENT HEADQUARTERS"

Dubuque, Iowa

"Tasco"
Gauges

are standard equipment on more than 50% of all Fuel Oil and Oil Burning devices on which gauges are used.



There are types for installation in ends, tops or sides of tanks—either with our standard flanges or with 1½ or 2 inch I P threads.

Send for complete information on different styles

The Akron-Selle Co.
"40 *Years in Business*"
Akron, Ohio

REDUCE APARTMENT HOUSE FUEL COSTS BY BURNING OIL

(*Continued from page* 11)

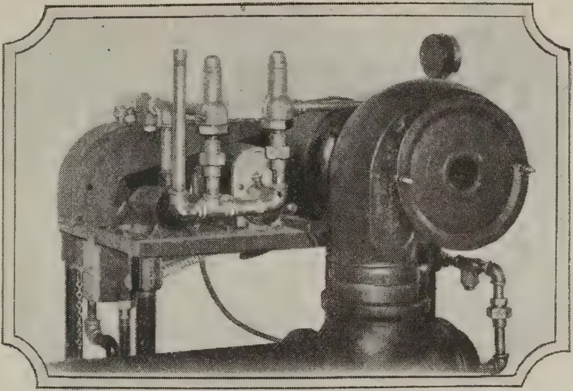
fitted with a No. 4 Ray rotary fuel oil burner and the small boiler with a No. 2. The fuel oil is stored in a rectangular tank of 10,500 gallons capacity, built on the job in the old coal valut. This tank is surrounded with a 12 in. concrete wall with a 6-in. space filled with sand between the tank and the wall.

Although the burners, pumps and piping system are designed to handle any grade of fuel oil available from 8 to 40 gravity, the owners decided to burn fuel oil of 24 gravity. As a circulating or loop system of piping was installed, it will only be necessary to install a small oil heater should these people desire to burn a heavier oil at any time.

Automatic Regulation

All of the burners are automatically regulated to maintain a fixed steam pressure of two pounds. This is done by means of a chain running from the damper regulator on each boiler to the automatic oil and air control device on each burner. When the weather suddenly turns cold and the load on the boiler is increased, the oil and air valves on the burner are automatically opened to produce a hotter fire, and when the load on the boiler decreases, the oil and air valves are automatically closed to produce a small fire. The device is so constructed that the oil and air remain in correct proportion and provide complete combustion at either a high or low fire.

One of the most interesting fea-



THE MAY AUTOMATIC OIL BURNER

Leadership!

Noiseless! Easily Installed! Perfect Combustion! The May Automatic Oil Burner is not only the simplest and most efficient oil burner built—it is the SAFEST!

Safety—Listed as Standard by Underwriters' Laboratories, Chicago.

Safety—Approved by the Board of Standards and Appeals, New York.

Simplicity—Completely automatic yet only 2 moving parts.

Easy to Install—No auxiliary storage oil tank necessary.

Quiet—Using Low Velocity Air.

Pioneers in Continuous Electric Ignition

MAY OIL BURNER CORP.

Executive Sales Office:
331 Madison Avenue at 43rd St.
New York City

Factory
Winchester Street, near Carey
Baltimore, Md.

A few zones open to Distributors in New England, New Jersey, Pennsylvania, Maryland, Virginia and New York State.

5

Minutes with

FUEL OIL

To manufacturers and sellers of equipment or material that can be used in the oil burning industry, a complete analysis of this growing field is now available.

It contains an illustrated survey of the entire oil burning industry, both industrial and domestic; of its purchasing power and habits; the amount and kind of material and equipment it buys; and a conservative, well grounded estimate of its future. It also tells of the headway oil burning is making in America's industrial plants and homes, and gives a list of the equipment and kinds of material purchased by the owners of these plants and homes.

You can base decisions on the specific facts and figures given.

The booklet is free. Mail the coupon below.

Whatever you sell—motors, belting, castings, sheet steel or the hundreds of other articles used in oil burning—the five minutes you spend reading it will be fruitful ones.

Tear along this line

Please send me your free booklet, "5 Minutes with FUEL OIL."

Name ....

Address ....

....

Our product is..................

tures is the hot water heating boiler in which the garbage and waste from the building is incinerated. This boiler is of the smokeless type with an upper grate formed of water tubes. The garbage and waste is thrown on the upper grate and is ignited by the flame from the oil burner below. The burner on this boiler is fitted with a cast iron, fire clay lined, hinged burner door. Any solid matter that falls through the grate bars into the fire box below may be quickly and easily cleaned out by simply swinging back the burner and door on their hinges. It is not necessary to disconnect any pipe or electric wiring.

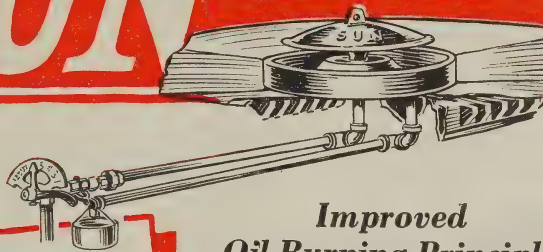
The heat extracted from the burning garbage and waste represents a considerable fuel saving and the cleanliness of this method is apparent.

The oil burning system was designed and installed by the Preferred Utilities Company of New York, distributors for the Ray oil burner.

Breese Engineering Company Reorganizes

According to an announcement by James L. Breese, Jr., the Breese Engineering Company, Chicago, has been reorganized, large financial interests having taken an interest in the company and its financing. The personnel of the company remains the same, however, and Mr. Breese will continue to devote his entire time to the production of the Breese Burn-Oil Boiler and to his extensive experimental work.

SUN Oil Burner



Heat Eq. Corp.,
Lincoln, Neb.,

Please express 12 Model C SUN burners complete with valves and fittings. Sold 21 with thermostatic control and a large number with hand control last winter. All owners delighted. The thing we like most is the small number of service calls. Expect to make a sales record this summer.

Oil Heating Eq. Co.,
Kansas City, Mo., 5-14-25

Improved Oil-Burning Principle

You can now install this splendid burner, proved by years of service in over 15,000 homes and business places, for less than $200 and yet make an attractive profit. Its performance has marked it as the most conspicuous success in the oil burner industry. Many experienced dealers now turning to SUN. Read the letter.

Highly efficient, yet simple in construction and operation. Complete with best safety features. Dependable low flame allows use of complete thermostatic control without pilot light. One man can install in 5 to 8 hours.

The Sun
TRADE MARK
AUTOMATIC
OIL BURNER

Use the Coupon Sign and mail the coupon today. Join our huge, successful selling organization. Company backed by Woods Bros., who enjoy highest rating given by Duns or Bradstreet. WRITE TODAY!

Heat Equipment Corp., 134 So. 13th St., Lincoln, Neb.

write for dealers prices and special proposition

Heat Equipment Corp.,
134 So. 13th St., Lincoln, Neb.,
Please send prices and special dealer proposition.

Name ....

Address ....

Air Tanks
Gasoline Tanks
Oil Tanks

Riveted, Welded or Brazed

(Catalog on Request)

Scaife Copper-Brazed Tanks will hold air indefinitely without loss of pressure.

Wm. B. Scaife & Sons Co.
Pittsburgh, Pa.
New York **Chicago**
26 Cortlandt St. **38 S. Dearborn St.**

HEAVY FUEL OIL MAKING GREAT HEADWAY IN EASTERN STATES

(*Continued from page* 16)

soon after by the Ritz-Carlton Hotel and since then installations have been made in hundreds of buildings of every class and description in Greater New York.

To mention only a few: the Equitable Building, New York Times, Metropolitan Life Insurance Building, Federal Reserve Bank, John Wanamaker's, R. H. Macy & Company, Knickerbocker Building, Waldorf-Astoria, Imperial Hotel, Mount Sinai Hospital, Johns-Manville Building, and the beautiful new group of buildings erected for the Institute for the Education of the Blind. Besides these there are hundreds of others.

The New York City Municipal Building is now being equipped to burn oil, the plant to be ready for operation early in the summer.

Although exact figures are not available, it is probable that at least three quarters of a million tons of coal annually have been displaced by oil in New York City in plants of all sizes to which fuel oil is delivered entirely by motor truck.

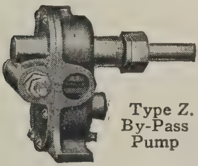
In Providence, R. I., practically every building of prominence in the city is burning this modern fuel. Outstanding examples are the new Providence-Biltmore Hotel and Brown University.

In Boston, one of the first plants to change over from coal to oil was the Harvard Medical School power plant, which furnishes heat, light, power and refrigeration for a group of thirty-four Hospital and

Oberdorfer Pumps

AN Oberdorfer Bronze Pump (Type Z) will carry any given quantity of fuel oil to the combustion chamber. A simple gauge sets the metering and thermostatic control regulates the release of fuel when needed.

A By-Pass within the pump eliminates the necessity of a separate fuel return line. Minimizes loss of fuel and guarantees efficiency.



Type Z.
By-Pass
Pump

Oberdorfer Motor Driven Pumps are equipped with automatic float switch for controlling flow of fuel oil from reserve tank to supply tank.

Catalogue "K" and name of dealer will be sent upon request.

M. L. Oberdorfer Brass Co.
SYRACUSE, N. Y.

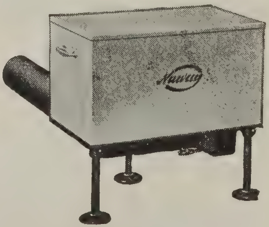
AUTOMATIC OIL BURNER
Nu-way
FOR HOME HEATING

A Simple Unit

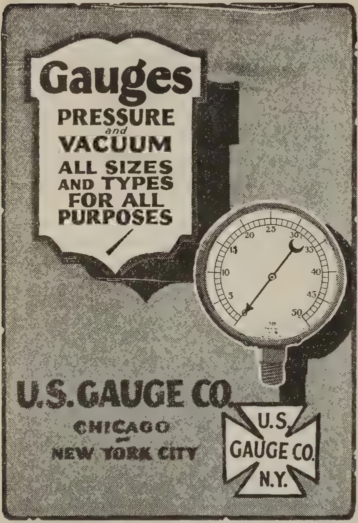
With Few Moving Parts

The Nu-Way is the simplest dependable automatic oil burner ever built. It is constructed with but few moving parts — entirely independent of intricate mechanisms. The thermostat, atomizer, ball-bearing motor, fuel feed control, and safety devices constitute a reliable efficient working unit which truly merits its place of supremacy among oil burners.

Nu-Way service records are available to reliable dealers. Write also for our booklet "Home Heating Supremacy."



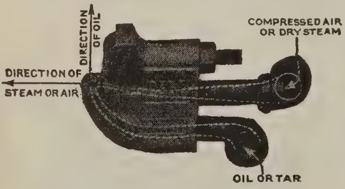
DOOLEY & BRADEN CO.
4506 Sixth Ave.
Rock Island, Illinois



W. N. BEST

Oil Burners

For Stationary, Marine and Locomotive Boilers
Liquid Fuel Furnaces and Equipment



Over 50,000 in operation in all forms of industrial service. Our engineers can help you.
Write for information.

W. N. BEST Corporation
11 Broadway, New York City

College buildings. Just a few other prominent buildings and institutions are Boston City Hospital, City Hall, large sewerage disposal pumping plant, schools, the newspaper building of the Boston *Transcript*, The Christian Science Publishing Society, Employers' Liability Insurance Building, Copley-Plaza Hotel, Packard Motor Car Company, Page & Shaw, Symphony Hall, Boston Athletic Association, United Drug Co., Kidder-Peabody Co. and the Revere Sugar Refinery.

Two Great Advantages

To rehearse here the many advantages of fuel oil is not necessary, but in New York City two factors alone, which are not ordinarily mentioned, ought to be emphasized. In the first place, practical experience in scores of installations has convinced owners and operators that the labor situation with oil is very much easier. The labor turn-over is far less, the men being better satisfied. This, of course, is apart from the large actual saving in payroll expense which can run into a tremendous item with large plants. For example, one prominent hotel is saving $12,000 a year on its boiler room payroll. Secondly, the oil truck glides up to the curb, parallel to the traffic and inside of ten minutes and while taking up no more space than an ordinary truck does drawn up to the curb, discharges an amount of fuel equivalent to approximately ten tons of coal. Considering the traffic conditions today the great advantages to all concerned are obvious.

The public expects, and in fact

SHELL

FUEL OIL
FURNACE OILS
DISTILLATES

"Shell Service"—with an individuality of its own—has made the most of a great natural shipping advantage—refineries at Roxana, Illinois and Arkansas City, Kansas—ideally located to serve one of the greatest petroleum consuming markets in the world.

ROXANA PETROLEUM CORPORATION
HEAD OFFICE • *ARCADE BUILDING* • ST LOUIS, MO.

Branch Sales Offices: • • • Chicago, Ill., 624 South Michigan Ave. • • • Kansas City, Mo., Federal Reserve Bank Bldg • • • Tulsa, Okla., Mayo Bldg. • Indianapolis, Ind., Meyer-Kiser Bank Bldg.

Refineries: Wood River, Illinois • Arkansas City, Kansas

ADDRESS ALL COMMUNICATIONS TO ST LOUIS OFFICE

Perfect purity
that's the point

SHELL
PETROLEUM
PRODUCTS

almost demands, automatic operation of all mechanical devices. In the residence burner field, prospective buyers ask but two question:

(1) Is the burner fully automatic?

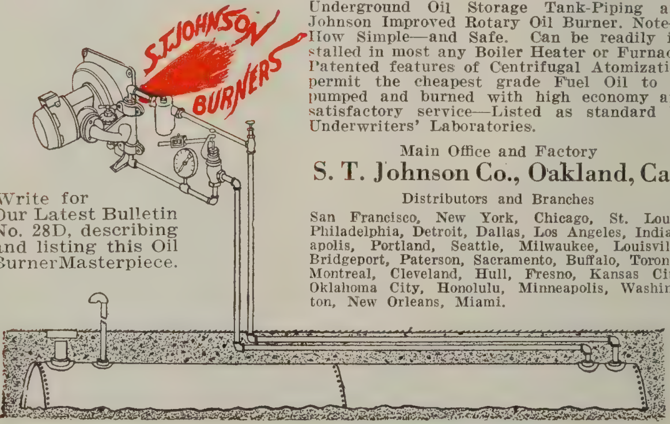
(2) Is it quiet?

I venture the prediction that within a few years apparatus for burning heavy oil, even on large installations, will have made tremendous strides toward complete regulation and control so that about the only manual operation would be that of initially starting the burner. For apartment houses and smaller buildings, and I am speaking now of heavy oil—14-16 deg. Baumé—this will apply to an even greater extent.

Production High

Since 1901 there have only been two years when the annual production of crude oil in the United States failed to show a substantial increase over the previous year. At present Russia's production and exports are again equalling or exceeding those of the highest prewar year. The production of oil in Persia and Venezuela has already reached a point which insures these countries becoming very large exporters within a few years.

With the ever increasing world wide production of crude oil and bearing in mind that under any known methods of refining and marketing, approximately one-half of the total output is, of necessity, to be disposed of as fuel oil and gas oil, there surely can be only one answer and that is an ever increasing market for fuel oil burning equipment of all kinds.



Improved Rotary Type 22

This cut shows a complete installation of Underground Oil Storage Tank-Piping and Johnson Improved Rotary Oil Burner. Note—How Simple—and Safe. Can be readily installed in most any Boiler Heater or Furnace. Patented features of Centrifugal Atomization permit the cheapest grade Fuel Oil to be pumped and burned with high economy and satisfactory service—Listed as standard by Underwriters' Laboratories.

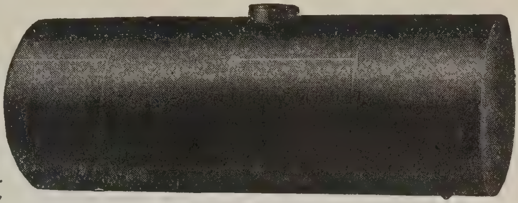
Main Office and Factory

S. T. Johnson Co., Oakland, Cal.

Distributors and Branches

San Francisco, New York, Chicago, St. Louis, Philadelphia, Detroit, Dallas, Los Angeles, Indianapolis, Portland, Seattle, Milwaukee, Louisville, Bridgeport, Paterson, Sacramento, Buffalo, Toronto, Montreal, Cleveland, Hull, Fresno, Kansas City, Oklahoma City, Honolulu, Minneapolis, Washington, New Orleans, Miami.

Write for Our Latest Bulletin No. 28D, describing and listing this Oil BurnerMasterpiece.



Dealers!

It's Best to Finish the Job Right

Give your customers complete service by advising them to install Butler-Built Tanks—the tanks that have Durability and Tightness built into them. They have longer life than ordinary tanks, are easier to install and assure you of complete customer satisfaction. The results we have been getting prove this. Don't take risks—advise for Butler.

Butler Fuel Oil Tanks are made in different styles and a wide range of sizes: 92 to 5,875 gallons and larger, if desired. Either black or galvanized steel is used, in light or heavy gage, depending on type or size of tank.

We'll be glad to help you with your customer service. Today send the coupon below and receive our valuable booklet on "Fuel Oil Tanks for Oil Burning Equipment." It will help you answer any of your customers' inquiries on tanks.

Two conveniently located plants enable us to give you prompt and efficient service on tank deliveries.

Butler Manufacturing Company
Kansas City, Mo. Minneapolis, Minn.

BUTLER MFG. CO.,
Kansas City, Mo.

Please send me your booklet on "Fuel Oil Tanks for Oil Burning Equipment." I want some useful tank information to give to my customers.

Name ....

Address ....

Distributing the ....Burner

Washington Dealers Use Cooperative Advertising

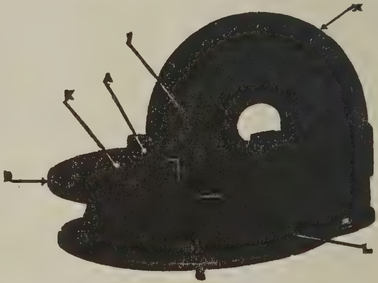
Cooperative newspaper advertising is being successfully used by oil burner dealers in Washington, D. C., a number of whom advertise under the name of the Associated Oil Burner Dealers of Washington. The advertisements stress the general advantages claimed for the automatic burners, citing heat control devices, cleanliness, etc. Each display also gives the names and addresses of the dealers handling the following burners: Nokol, Ballard, Electrol, Oil-O-Matic, Gill, Kleen Heet, Ray, Caloroil, and A.B.C.

Bowles Requests Information

J. T.-B. Bowles, technologist of the American Oil Burner Association, has sent a request to the members of the association for information concerning their equipment, price lists, and other data. It is the intention of the technologist to have a complete file of such information that will enable the New York office of the association to intelligently answer questions concerning members' equipment. As this file is being made-up members are requested to send in this matter at an early date to expedite the work.

Takes Maryland Agency

The Automatic Burner Company of Maryland, Baltimore, Md., has taken over the agency for the ABC burners for the state of Maryland. Wilmer H. Senner, formerly with the Fuel Heating Company, is now associated with the Automatic Burner Company.

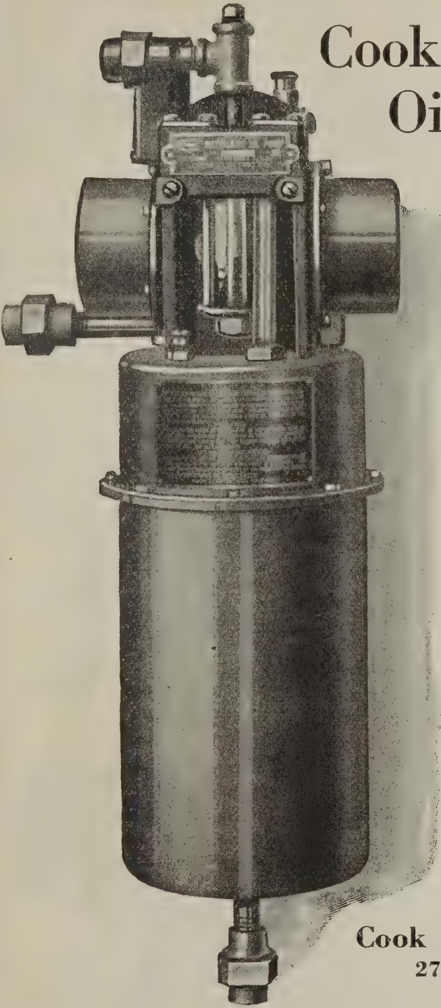


Why the Liberty Burner Is Best

1. *Low Priced.* Within the means of any family.
2. *No Soot, Smoke or Carbon.* Oil vaporized and mixed with air insures complete combustion.
3. *Quiet.* Practically without noise.
4. *Odorless.* No odor in house.
5. *Lasting.* No moving parts to wear out.
6. *Automatic.* Either thermostatic or manual control.

Exclusive Representatives Wanted

LIBERTY OIL BURNER COMPANY, INC.
1605 Leavenworth Street, Omaha, Nebraska



Cook Automatic Oil Pump

Maintains a constant level of oil.

Is anti-syphoning.

Electric, fully automatic, no packing to leak.

Circuit is opened and closed by mercury switch.

Circuit wires insulated with special oil-proof insulation.

Series motor operates on D. C. or A. C. current.

Bearings operate under oil.

Safety device prevents oil from being pumped on floor in case of broken pipes.

No oil storage in basement.

Quiet, efficient, economical to operate, and low in price.

Full Information
Upon Request

Cook Electric Company
2700 Southport Ave.,
Chicago, Ill.

Built on Two Years of Field Experience

WHAT OIL BURNER "SERVICE" REALLY MEANS

(*Continued from page* 12)

of continually being serviced. A machine which gives a nice hot fire using oil for fuel is easily constructed, but some men who are experienced in the industry, believe that the real efficient and stable oil burner is a machine of the future.

The requirements of a successful oil burner are severe. It must correlate conditions of positive ignition and efficient combustion of fuel oils varying considerably in their chemical composition and physical characteristics. The wide variation of installation conditions must not affect the work of the burner, if successful service is to be rendered. The salesman, then has a machine to produce oil burning conditions, and the production of the conditions are his stock in trade. The prospective customer should be thoroughly interested in how well these conditions are met, the mechanical perfection of the machine and the adaptability of the burner to his furnace.

Combustion Studied

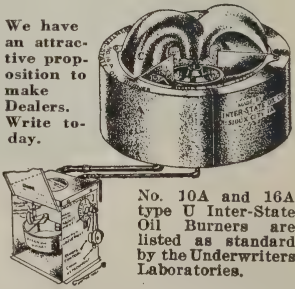
If we are interested in securing the best conditions for the ignition and combustion of fuel oils, we are necessarily interested in the results of the work done in this field of which we have a record in scientific literature. The combustion of many compounds, similar to those found in fuel oils, have been studied by many chemists. This field of research has furnished proof of many theories regarding chemical

INTER-STATE
OIL BURNERS
GUARANTEED 10 YEARS

Here is the simplest gravity feed, natural draft, self cleaning, non-carbonizing Oil Burner on the market. Equipped with Underwriters approved, combined oil feed and automatic shut-off device. Guaranteed for ten years but will actually last a lifetime. The Burner that will assure a dependable output for Distillate, or Kerosene. Just the thing for live wire oil men to increase their gallonage during the winter months.

Inter-State Oil Company
Sioux City, Iowa

We have an attractive proposition to make Dealers. Write today.



No. 10A and 16A type U Inter-State Oil Burners are listed as standard by the Underwriters Laboratories.

A Trainload of Tanks Every Day

Every working day of the month, every month of the year, a complete trainload of "Youngstown" tanks leaves our plant, its cargo destined for most corners of the globe.

There are cars of 100 gallon tanks—1,000 gallon tanks—10,000 gallon tanks, and in some cases cars containing material for 80,000 barrel tanks.

Tanks of every type and size, for every requirement—some with welded seams, others welded and riveted and still others super-riveted-welded—all built for service—all built heavier than necessary—all guaranteed—all tested and known to be tight.

By standardizing in sizes we are enabled to ship you a better tank for less money.

Write for copy of Catalog No. 500, on your business stationery

THE YOUNGSTOWN BOILER & TANK CO.
YOUNGSTOWN, OHIO

Youngstown
"KEENE TANKS MADE"
STANDARDIZED
REG. U.S. PAT. OFF.

MORE THAN 150,000 *IN SERVICE*

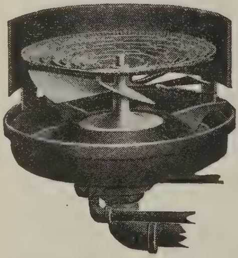
reactions. The literature on combustion seems endless, but it represents beaten paths which are easily followed, and it is the sure foundation for the building of the successful industry.

At the close of the World War we were told, in all of our journals, that one of the most valuable advances of American industry was that it learned, during this period, to use the literature in its field as a foundation for its development. It was stated that American industry had discovered that scientific literature through which the results of the centuries of experimental work by the great scientists and engineers is available to everyone. Today we can apply the researches that have been made in pure science and profit by the scientists ofthe last generation.

The varying composition and characters of fuel oils make the selection of representative compounds rather difficult. We can, however, choose the compounds most similar to those occurring in fuel oils and collect the data recorded regarding them. Complete data is available for very few compounds, but many compounds have been observed during oxidation and we have a large mass of interesting data.

Wayne Publishes Catalog

Cutting off the supply of both the oil and the electricity in case of irregularity of operation is the feature of the Wayne oil burner, according to a recent catalog issued by the Wayne Tank and Pump Company of Fort Wayne, Ind.

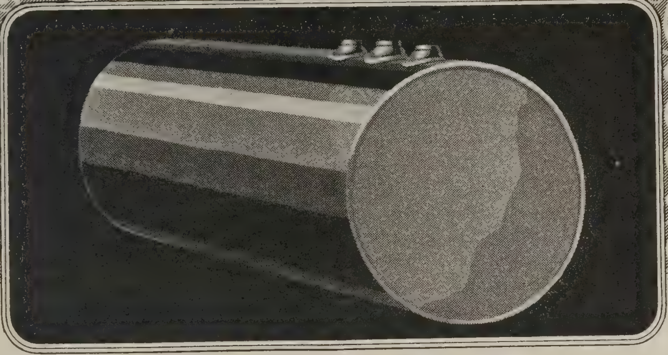


The Rotary Oil Burner

is designed for use in steam and hot water heating systems, hot air furnaces, water heaters, ranges, etc. It produces maximum furnace efficiency by vaporizing the oil and mixing the oil-gas with the proper amount of oxygen, at the point of combustion. Uses fuel distillate of 27 to 36 gravity.

ROTARY MANUFACTURING COMPANY
1526 Santa Fe Avenue Los Angeles, Calif.

Eastern Manufacturer, 1934 Market St., Philadelphia, Penn.
Established 1908 Handled by distributors
Chicago, St. Louis, San Francisco, Oakland and others



"Seeing is Believing"

It is an old saying — but not so true as it sounds. The eye is easily deceived. Take oil storage tanks for instance. A casual "eye inspection" of two tanks may show no apparent differences, yet a pressure test for tightness might prove one leaky — the other tight. You may fool the eye, but you cannot fool the mercury gauge.

Every Gilbert & Barker storage tank for furnace oil is made of the best material, expertly constructed and tested under pressure and known to be absolutely oil tight. Selecting such tanks eliminates "eye judgement." You *know* you're getting tanks that can be relied on for dependable service.

Capacities 285 to 2000 gallons. Write for prices.

GILBERT AND BARKER
MANUFACTURING COMPANY
GASOLINE AND OIL STORAGE EQUIPMENT
SPRINGFIELD, MASS., U.S.A.

ANALYSIS OF OIL FLAMES

(*Continued from page* 28)

which cannot be seen by the eye. They have also been found to affect the growth and health of man, animals and plants. The sun's radiation is rich in these rays and light from mercury vapor lamps in fused quartz tubes contain many of these wave-lengths.

Infra-Red Rays

On the long wave side of visible light are the infra-red, or heat waves. Many substances, such as water, easily penetrated by visible light are relatively opaque to infra-red rays, and most of the hydrocarbons stop these wave-lengths that range from 16 millionths to 12 thousandths of an inch. Themometers record this sort of radiation and photographic plates specially treated with red sensitive dyes can be made to record the infra-red.

Still longer than the infra-red rays are the Hertizien, or radio waves, used in broadcasting. These are received by wires and coils, and may be rectified and transformed in such a way that they produce sound when fed into telephone receivers.

You are all familiar with the method employed in modern receivers of transforming the radio frequencies into much lower audible frequencies. My thought is this: If the chemical reaction that we are studying produces rays of vibration which we can see and feel, there is no logical reason why they are not producing

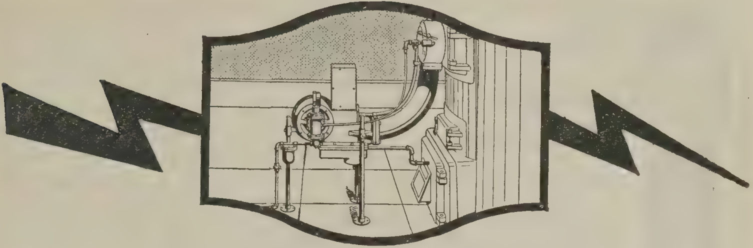
CON-TAC-TOR MERCURY SWITCHES

Solve YOUR Control Problems

NEW SAFETY CIRCUIT

ABSOLUTE CON-TAC-TOR CORP'N

Beloit, Wis.



The Truth About Electric Ignition

Electric spark plug ignition of oil for heating purposes was successfully achieved more than 15 years ago.

In June 1919, this principle was first applied to domestic oil burners. Its practicability was demonstrated in the winter which followed.

The development of electric ignition for oil heaters was carried out by the engineers who designed the Electrol Automatic Oil Burner. When false or misleading claims are made that electric ignition in oil burners has now been perfected or developed for the first time by any one, this can be characterized in only one way.

Yet these claims are natural enough. The price of pioneering is always imitation. The penalty of leadership is always the envy of those who only follow.

When false claims are made in advertising (as they have been made concerning the development of electric ignition for oil burners), we must remind you "truth in advertising means honesty in product."

HOME APPLIANCE CORPORATION
2818 Locust Blvd. St. Louis, Mo.

The Electrol Automatic Oil Burner is the perfected oil burner with the added essential feature of entirely automatic electric ignition. Some desirable territory is still available. Write for particulars.

(Scott-Newcomb System)

ELECTROL

Electric Ignition Quiet Operation

AUTOMATIC OIL BURNER

SWORD

The Leading Oil Burner

On the American Market

Its exclusive method of burning fuel oil makes the SWORD Automatic Oil Burner: Silent as a coal fire; clean as a gas flame; cheaper than any known means of heating a home furnace.

Literature on Request

Sword & Kimber Company

4861 Stenton Ave., Phila.

ELECTRIC WELDED

STEEL TANKS

Largest Stock in Metropolitan District
Quick Deliveries
At Competitive Prices

EARL C. MAXWELL CO.
93—123 13TH ST.
BROOKLYN, N.Y.

other rays both higher and lower than our senses can perceive, and if we find that a considerable portion of the energy produced by reaction lies in the ultra-violet and infra-red sides of the range, might it not be possible to devise means of transforming these frequencies back to the frequencies of the heat range, and thereby produce more useful heat than we are now obtaining?

We have on our hands, for the next ten years, competition with the gas-man and then with the electrical light companies. The only oil-burner which will be capable of standing up against these two competitors will be far different from your present conception of a burner, and will, in fact, be nothing more than a method of combustion, and will be an inherent part of the heat absorbing medium. The two competitors, gas and electricity, should not be taken lightly, and only by knowing our subject better than they know theirs can we provide a type of heat which will be more than their equal in results obtained, and far below them in cost of operation.

Describes Falk Diesel Engine Factory

Users of Diesel engines will find much of interest in a recent publication of the Falk Corporation, Milwaukee, in which a fine description is given of the facilities at their main plant for the fabrication of oil engines. The power at this large plant is derived from four 550 hp. oil engines of the marine type.

YOUR ad could occupy this whole page in **Fuel Oil** next month, and go into the hands of 12,500 oil fuel users for $85.00.

You can buy a space of this size, a quarter page, for $30.00
or

This little one-eight page costs $21.50. Cheap enough, if big enough.

One twice as large, a half-page, for $45.00

Every Fuel Oil reader is a bona fide prospect for any article or service that can play a worthwhile part in Oil Burning

Prices are for 12-time contract

Marine Fuel Oil Consumption Increases

According to returns received by the American Petroleum Institute from the principal companies engaged in the marine fuel oil business, 73,031,000 barrels of fuel oil were delivered for ships' bunkers at U. S. ports and at U. S. Insular possessions in 1924, compared with 62,825,000 barrels in 1923, an increase of 10,206,000 barrels, or 16.2 per cent. This is exclusive of fuel oil delivered to the United States Navy. The United States Navy in 1924 consumed approximately 6,300,000 barrels, compared with 5,200,000 barrels in 1923, this including Diesel oil and covering consumption by naval vessels, but not including consumption at yards and stations. The indicated total marine and navy consumption is shown as follows:

Consumption of Fuel Oil by Merchant Vessels and U. S. Navy

	1924 Barrels	1923 Barrels	Per Cent Increase
By merchant vessels ...	73,301,000	62,825,000	16.2
By U. S. Navy	6,300,000	5,200,000	21.2
Total ..	79,331,000	68,025,000	16.6

May Burner Approved

New York City Board of Standards and Appeals and Underwriters Laboratories have approved the May burner, according to an announcement by the May Oil Burner Company of Baltimore. This company is reporting large sales in the New England States as a result of an aggressive sales campaign recently inaugurated in that part of the country.

Change Sales Territory

The Johnson Fuel Oil Burner Company of Bridgeport, Conn., has given to the Automatic Oil Burner Corporation, New York City, its eastern New York State territory, in connection with the Stratton Motors Company of Albany, N. Y. A previous statement in FUEL OIL, to the effect that the territory included Massachusetts, was incorrect.

Fuel Oil Delivered for Ships' Bunkers 1924 and 1923

(Barrels of 42 gallons)

(Statistics of the American Petroleum Institute)

	Domestic Oil, Barrels	Per Cent of Total	Mexican Oil, Barrels	Per Cent of Total	Total Barrels	Per Cent of Total
			AT ATLANTIC COAST PORTS			
1924....	18,856,000	34.7	11,677,000	62.4	30,533,000	41.8
1923....	12,759,000	28.7	11,727,000	63.7	24,486,000	39.0
			AT GULF COAST PORTS			
1924....	5,462,000	10.0	6,704,000	35.8	12,166,000	16.7
1923....	4,133,000	9.4	6,157,000	33.4	10,290,000	16.4
			AT PACIFIC COAST PORTS			
1924....	29,090,000	53.6	....	....	29,090,000	39.8
1923....	26,829,000	60.4	....	....	26,829,000	42.7
			AT INSULAR POSSESSIONS			
1924....	915,000	1.7	327,000	1.8	1,242,000	1.7
1923....	682,000	1.5	538,000	2.9	1,220,000	1.9
			TOTAL			
1924....	54,323,000	100.0	18,708,000	100.0	73,031,000	100.0
1923....	44,403,000	100.0	18,422,000	100.0	62,825,000	100.0

Gill

AUTOMATIC

Oil Burner

Sheer merit is the basic reason why heating engineers strongly recommend the Gill Automatic Oil Burner and why the Gill distributorship is most profitable.

Simple in construction—positive in operation, Gill Automatic Oil Burners give complete satisfaction.

You do not have to spend your profits servicing a Gill Burner.

Gill Manufacturing Co.

8300 South Chicago Ave.
Chicago, Illinois

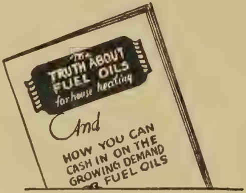
Write for details of our selling franchise

"The Truth About

FUEL OIL

for House Heating"

—An Empire Contribution
To a Growing Industry



After having made a wide investigation of the domestic, househeating market for fuel oil, we have published our conclusions in a handy little booklet entitled, "The Truth About Fuel Oil for House Heating."

This little booklet is already in its second edition and has created a great deal of interest among oil men and burner men all over this country and in many other parts of the world.

You are invited to write our Tulsa office for a copy now. There's no obligation.

CITIES SERVICE OILS
ONCE-ALWAYS

EMPIRE REFINERIES, Inc.

Subsidiary Cities Service Co.

General Offices, Tulsa, Oklahoma

Offices: New York, Philadelphia, Cleveland, Chicago,
St. Paul, Atlanta, New Orleans, Kansas City,
St. Louis, Ft. Worth

Consulting Page

Q. We have a vertical tube boiler, 36 in. by 6 ft., that we are using for steam for a small pickle room. In the past we have always burned coal in this boiler, but we are wondering if we could change same to burn oil without too much trouble. Please advise us how we should change the firebox on this boiler in order to burn oil.
H. B. G., Cleveland, Ohio.

Ans. Unless we could have more detailed information than you have given us, it would be extremely difficult to give you any specific advice. Morever, there are no set rules for changing over the firebox, as the changes, if any are required, are dictated by the style of burner used, condition of boiler desired, etc. We do not have the space in this column to cover the subject thoroughly. If you decide to install a burner, you will ultimately find it necessary, of course, to consult a burner manufacturer or dealer. You had best leave the converting of the firebox to him, as he will be better informed on what his burner and your boiler will require in the way of changes. Also, we have several very good books on oil burning that contain several chapters each on firebox conversions.

Q. To what extent is oil being used in factory boilers in the United States?
E. J. B., Buffalo, N. Y.

Ans. In 1924 a total of 292,013,107 barrels (42 gallons each) of fuel oil were consumed in the United States. It is impossible to tell how much of it was burned in factory boilers, but probably one-half of it was consumed by locomotives, ocean steamers, and in public utility plants. The rest was burned in various industrial plants, a good percentage of which were probably factories.

Q. Do you know of any general schools of oil burning in this country—preferably having short courses? I would appreciate some information on the subject.
J. H., Chicago, Ill.

Ans. Probably the two best short-course schools of oil burning in the United States at present are those conducted by the U. S. Shipping Board at the Philadelphia Navy Yard and at the Mare Island Navy Station on the Pacific Coast. These courses cover but five days and, although they naturally require the student to give much of his attention to marine boilers, the lectures and laboratory work devoted to general oil burning topics are valuable enough to warrant any one at all interested in oil burning taking the course if he can obtain permission from the Shipping Board, which originally instituted the school for the education of its own engineers only.

Other schools that offer general oil burning courses are: Hayes Research Institute, Chicago; Brooklyn Polytechnic Institute, Brooklyn, N. Y.; Socony Burner Corporation, Brooklyn, N. Y.; New York University, New York City. The Brooklyn Polytech. and New York U. courses extend over an entire semester of four months.

Q. A scientist recently gave a lecture before the local Chamber of Commerce in which he stated that the recent discovery, by a French chemist, of a motor fuel that is a combination of wood alcohol and methanol had sounded the death knell of gasoline for combustion in automobiles. Do you think this new fuel will affect the price of fuel oil? J.D.W., Charlotte, N. C.

Ans. These substitutes for gasoline are continually being "discovered" and praised as the ultimate motor fuel. To date, however, none of them has been produced cheaply enough in commercial quantities to compete with gasoline. From the reviews given this research work on synthetic methanol by the leading chemist's journals, it does not appear to offer any more competition to gasoline than its predecessors. We do not think it will affect the oil price structures in this country.

Q. Last year several issues of FUEL OIL contained advertisements of a firm which manufactures a product intended to be used in fuel oil tanks to prevent the formation of sludge. Please give us the name and address of this company, J.J.T., Providence, R. I.

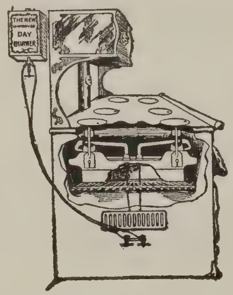
Ans. United Fuel and Iron Company, Keenan Building, Pittsburgh, Pa.

Enco

Oil-Burning Equipment

The most advanced system of oil burning yet devised. Send today for "Oil Burning Under Steam Boilers." It explains in detail the many advantages of the Enco System.

The Engineer Company
17 Battery Place, New York
Branch Offices in the Larger Cities



Why Overlook This Opportunity?

Every Cook Stove and Range a prospect. Think of the volume.
Sold with Absolute Guarantee.
Dealers and Distributors wanted.

Day Oil Burner Co., Inc.
904 West Lake Street
Minneapolis Minnesota

THE "10% SAVING OVER ANY OTHER BURNER" FOLLY

(*Continued from page* 21)

combustion of the fuel and the operation of his own equipment. The effectiveness with which the boilers absorb the heat generated in the furnace is another matter. But the plant operator is not a combustion engineer, and his first interest is in the amount of steam generated by a known amount of oil rather than the technique of combustion. Hence the salesman selling guarantees by skillful and eloquent presentation gets a very cordial hearing.

In many cases—perhaps most of them—after the equipment is in and the plant operating with more or less satisfaction, the matter of the guarantee or an actual test is never again mentioned. If by some chance the plant owner insists on a test, the question of who shall pay for it offers a hurdle which often results in no test being made. Since anything like an adequate test of the burner will cost from $1,000 to $1,500, when the plant owner learns he will have to pay for the test he often concludes to do without it, if the equipment seems to be satisfactory. Frequently when boiler tests are made against a guarantee some artificial and hidden means of getting the "saving" is resorted to.

Dearly Bought Knowledge

Purchasing agents and plant owners are learning, often to their sorrow, that the size of the guarantee too often varies in inverse ratio to the engineering experience and skill

Don't have your customers depend on a stick to measure the oil in the storage tank. Use the modern method.

A Pneumercator Tank Gauge

may be placed anywhere. It tells instantaneously how much oil there is in the tank. Make it standard equipment.

PNEUMERCATOR COMPANY, INC.

40 Flatbush Ave. Extension Brooklyn, N. Y.

Simple—Sturdy—Dependable

DEPENDABILITY is the big thing necessary in an oil pump. The Paul Type "RRO" revolving, reciprocating oil pump has no valves or internal packing so it goes right on working month after month without "free service" or attention.

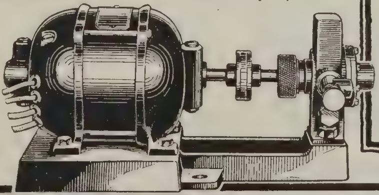
Fort Wayne Engineering & Mfg. Co.

Main Office and Factory
1712 N. Harrison St. Fort Wayne, Ind.

Write for Bulletin 5031

Double Acting
No Vibration
No Valves
Noiseless
No Packing
Uniform Flow of Oil

PAUL



Type "RRO" Oil Pump

A Low Priced Dependable Burner

There is no better burner than the Ideal. It is far lower in price than other satisfactory burners. Some models including tank sell to dealers for less than a hundred dollars.

Water and electric driven. Four sizes of each.

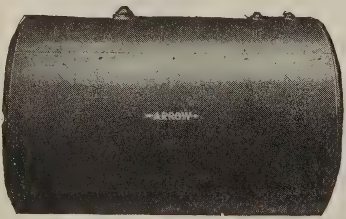
We have never failed to make a connection with a prospective distributor who investigated our burner and sales franchise to the limit.

Your territory may still be open. Write or wire for information.

Ideal Rotary Burner Co.
21 W. Clark Ave., York, Pa.

»» ARROW ➤

Unconditionally
Guaranteed
Oil Storage Tanks



The Novelty Steam Boiler Works Co.
929 S Howard St., BALTIMORE, MD.

of the company selling it, and as a result are asking the burner manufacturer to guarantee only design, material and workmanship. They also ask the guarantee that the burner will be able to give the required capacity with the draft available, and further that there will be no errors in the burner arrangement which will cause undue wear on the brickwork and heating surface.

Discriminating buyers of oil burners are learning that the responsibilities of the burner manufacturer end when he has burned the fuel with a minimum of excess air, without smoke, without CO, and at such rate as to give the required capacity. Even buyers unfamiliar with combustion are learning that the factors of engineering experience and skill which make the conservative burner manufacturer unwilling to sell their equipment on the basis of extravagant "guarantees" are the elements most needed to insure continuous economy of operation. They have learned that "guarantees" do not run a power plant.

A shrewd engineer, who had tried without success to operate on a "guarantee," said meaningly, "No matter how generous the guarantee, reading it is poor consolation when you can't get up enough steam to carry your plant to the capacity you need."

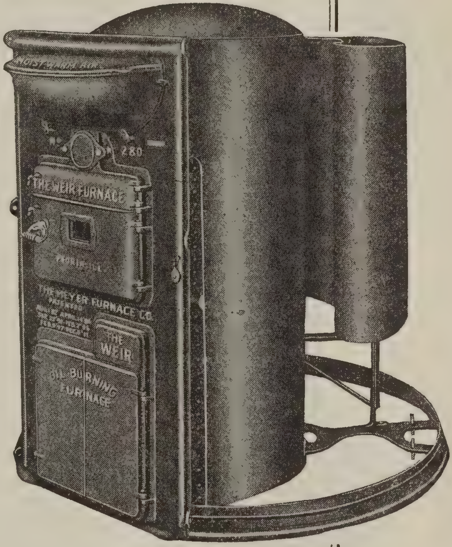
New Vessels Burn Oil

Of the 31 vessels listed by the American Bureau of Shipping, New York, on May 1 as "principal tonnage now building," 27 were classified as oil burners, and the remainder as coal burners.

The WEIR Furnace

is not an experiment

It has been over 40 years on the market, growing in popularity year after year, and today it is recognized as the one proven warm air furnace for oil burning.



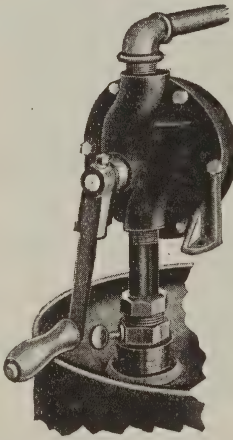
Get the Facts about
The WEIR Oil Burning Furnace

Write

THE MEYER FURNACE COMPANY
PEORIA, ILLINOIS

MECHANICAL DEVICES COMPANY

M-D-Co. Hand and Power Rotary Pumps for Transferring Fuel Oil



M-D-Co. No. 553 Hand Pump attached to storage tank with M-D-Co. No. 210 Bushing. By use of this bushing ease in attaching suction pipe and rigidity to pump is assured.

M-D-Co. Pumping Equipment is especially designed for handling fuel oils.

Mechanical Devices Co.
Manufacturers
Aurora, Illinois

RECORDING INSTRUMENTS AN AID IN EFFICIENT BURNER OPERATION

(*Continued from page* 10)

combustion, and consequently, if the operator can maintain an average of from 12 to 14 per cent, he is doing all that can be expected of him.

The cost of the necessary instruments which the owner and contractor should both insist upon for their own protection represents a very small percentage of the total cost of an oil-burning installation.

Two Classes

Steam flow meters can be practically subdivided into two classifications: those mechanically operated and those electrically operated. The latter is the modern and most convenient type because of its simplicity and absence from cumbersome moving parts and because of its flexibility. The proper type of steam flow meter for boiler use is the indicating, recording and integrating type. The indicator and recorder serve as guides to the operator, the recorder provides a continuous record of the boiler performance, and the integrator totalizes this record. The electrical type of steam flow meter permits the best arrangement of measuring instruments, the customary installation being to locate the indicator on the boiler front in full view of the operator for his guidance and to locate the recorder and integrator on a separate panel board in the chief engineer's office where the operation can be served and where the records are kept.

The electrical type of CO_2 recorder is perhaps the coming type of in-

There is ONE gem of Domestic Oil Burners

The TIFFANY

Sturdy, simple, quiet, unfailingly reliable and of course, entirely automatic—That is *THE TIFFANY OIL BURNER.*

It is built in one model, with a range capable of taking care of 300 sq. ft. to 5000 sq. ft. of steam radiation.

It is designed and built to use 26 degrees—28 degrees Baume oils or distillates. There is just one moving part, and *that* is amply protected from the heat. Service calls are rare with the *TIFFANY BURNER.*

The burner is the result of three years' specializing in the design and building of centrifugal type, mechanical atomizing oil burners. Its Air Balance control—an exclusive feature—insures perfect combustion with any grade of oils that will flow freely.

The movable electric ignition element, that automatically enters the fire pot, unfailingly ignites any grade of oil at any time, and afterward removes itself from the fire pot and flame, is found only in this burner.

The Tiffany Oil Burner—at all times a quiet burner—is particularly adapted to hot air furnaces, because of its cantilever construction. No sound or vibration is transferred to the metal floor or shell of a hot air furnace. Included in standard equipment of this burner is the Janette drive motor, Honeywell temperature and boiler control, and Mercoid safety switch.

The retail price of the burner exclusive of Oil Storage tanks is less than $400.00.

A very attractive sales proposition, as well as desirable territory, is open to dealers and distributors who can qualify. Write now for detailed information and description of

THE TIFFANY OIL BURNER
GEM OF BURNERS FOR THE HOME

Manufactured and Distributed by

THE TIFFANY COMPANY
58 FIRST ST. **NEWARK, N. J.**

strument in this line, but present developments are not adapted for the rigorous service experienced in the boiler room and hence the chemical reagent type is still considered as standard by most engineers. As all CO_2 recorders require a small amount of attention, it is important that the simplest design be specified and the service rendered by the manufacturer should play no small part in selecting the type of instrument to be installed.

Savings Shown

In the following tables are shown the cost of and savings attributed to steam flow meters and CO_2 recorders at two large industrial plants in this country. The figures given have been verified by these plants and should be of some value for estimating purposes.

John F. Trommer, Inc., Brooklyn, N. Y.

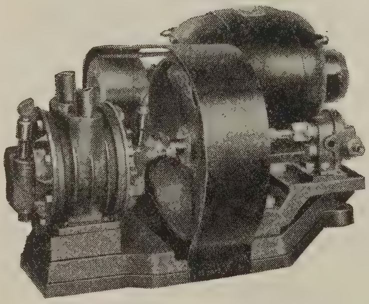
Cost of Operation—Republic Flow Meters

Depreciation—\$375.00÷20 years	\$18.75
*Average interest at 6%—$\frac{21}{20}\times\frac{\$375.00\times .06}{2}$	11.81
Maintenance, repairs and supplies	10.00
Power per year—54 K.W.H.×\$.03	1.62
Total cost per year	\$42.18
Cost per day—\$42.18÷365	\$ .12

Savings Effected by Three Republic Flow Meters

Fuel consumed per day, average	1,900 Gals.
Fuel consumed per year —1,900×365	693,500 Gals.
Average evaporation per lb. of fuel oil	14.3 Lbs.
Percentage increase in evaporation after meters were installed	5.6 %
Saving in fuel —$\frac{.056}{.0944}\times 693{,}500$	41,140 Gals.
Saving per year —41,140 gals.×\$.04½	\$1,851.30
Savings in repairs to grates, lining, etc., estimated	

LAMMERT ROTARY PUMPS
FOR OIL BURNERS



A dependable pump built for 20 years—Sizes 3½ to 700 cu. ft. Free air per minute pressure to 25 lbs. Types for special requirements.

Oil pump coupled to air pump shaft.

Simple construction — No valves or troublesome parts. Automatically lubricated.

LAMMERT & MANN CO.
Oil Burner Dept.
215-21 N. WOOD ST. CHICAGO, ILL.

97% Perfect Combustion

Get your copy of the report of this test made on a SUPREME OIL BURNER.

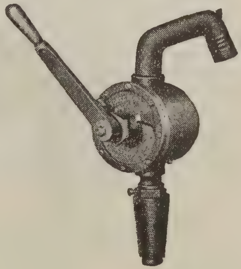
Dependable, Efficient, Simple and Safe. Materials and Workmanship the BEST.

Dealers, Distributers

This is the best proposition ever offered you on a high-class burner that is RIGHT, and the PRICE is RIGHT. Literature and prices on request.

Supreme Mfg. & Machine Co.
6 East 27th St. Minneapolis, Minn.

To Oil Burner Manufacturers and Dealers:



The Force Pump delivers from 12-15 gallons per minute with the slightest pressure on the handle. No strength is necessary to operate it. It sometimes happens in emergencies that wife or child mav have to take care of filling supply tank in basement. Either one can do it in just one-half minute without undue effort, by using the Force Pump, the pump of long life and satisfaction.

Allow us to send you one for demonstrating purposes.

FORCE PUMP COMPANY
1821 Berteau Avenue CHICAGO, ILLINOIS

Name........................ Address.........................

....

KELLOGG
COMPRESSORS

Air
Compressors.
Vacuum
Pumps.
Special Oil Burning
Equipment.

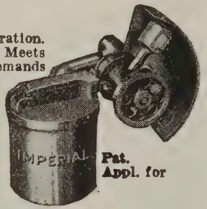
Our engineering and production departments are at your service in increasing your output of Oil Burners.

Send Direct

KELLOGG
MANUFACTURING
COMPANY
Rochester, New York

IMPERIAL OIL CONTROL
And Safety Trip Valve

Positive operation. Easy to install. Meets all service demands better.



Approved by
Underwriters
Laboratories

Pat.
Appl. for

Other Imperial Oil Burner
Specialties are:

- Safety Trip Valves
- Indicator Valves
- Oil Strainers
- Shut-off Cocks
- Needle-Valve Drain Cocks
- Copper Tubing
- Oxygen Carbon Burning Outfits
- Brass Pipe Fittings
- Tubing Couplings
- Angle and Globe Needle Valves

Write for catalog of sizes and prices.

The Imperial Brass Mfg. Co.
1224 W. Harrison St. Chicago, Ill.

—$275.00×3	825.00
Total, saving per year.........	$2,676.30
Cost of meters per year.......	126.54
Net saving per year...........	$2,549.76

This saving pays for all three meters in less than 5 months.

*Allowing for interest earned by depreciation reserve.

Sun Oil Company, Marcus Hook, Pa.

Cost of Operation—One Republic CO_2 Recorder

Depreciation—$287.00÷15 years...	$19.13
*Average interest at 6% —$\frac{16}{15}\times\frac{\$287.00\times.06}{2}$	9.18
Maintenance and repairs, labor and materials	20.00
Total cost of operation, per year.	$48.31
Cost per day—$48.31÷315 days..$	.15

Savings Effected by Seven Republic CO_2 Recorders

Percent CO_2 obtained with recorders—average	12%
Percent CO_2 obtained without recorders (approx.)	8%
Percent saving in fuel......	8.5%
Fuel burned in 24 hours by one 500 H.P. boiler......	7,200 Gals.
Saving in fuel with recorders —7,200×8.5%	612 Gals.
Saving per day, average—612 gals.×$.033	$20.20
Saving per year per 500 H.P. boiler—$20.20×315 ...	$6,363.00
Saving per year with all 7 recorders on five 500 H.P. and two 250 H.P. boilers, average	$38,178.00

This saving pays for the entire cost of the recorders in less than 2 weeks' full operation.

*Allowing for interest earned by depreciation reserve.

It may be rightfully argued that the savings as shown in the above data cannot be directly attributed to the instruments themselves. Flow meters and CO_2 recorders do not automatically effect savings, but the fact remains that the plants supplying this information would probably have never increased their efficiencies without the aid of the instruments and might actually have suffered further losses by continuing to operate in the dark.

Now!

The Ultimate Domestic OIL BURNER

Silent and Automatic

A "Power-type" Burner suited for all types of boilers or furnaces. Selling to consumer for

$350 $50 *down—balance in ten months*

Valuable territory still open for aggressive distributors. If you can qualify, get in touch with us immediately.

SILENT AUTOMATIC BURNER CORP
255 Meldrum Avenue
Detroit, Mich.

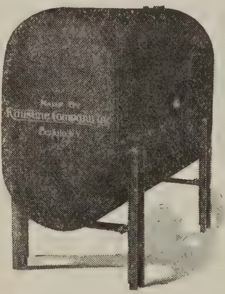
Emerson Motors
Single Phase, Polyphase and D. C.
(Interchangeable)

2 *H.P.*
and
Smaller

For thirty years we have specialized in producing motors in these sizes.

The Emerson Electric Mfg. Co.
2018 Washington Ave.,
St. Louis, Mo.
50 Church St., New York City
(*We sell motors only to those buying for resale*)

TANKS



OBROUND TYPE
Also DUPLEX and
CYLINDRICAL TYPES
All Sizes—Write for Prices
Kaustine Co., Inc.
Buffalo, N. Y.

PURIFYING FEED WATER TO PREVENT COSTLY SCALE

(*Continued from page* 14)

to the zeolite and it leaves the softener carrying a solution of the magnesium and calcium salts taken from the zeolite. After being thus revivified, the excess brine in the bed is washed out and the softener is again ready for use.

In the zeolite process, only a few minutes are required for the treatment. A sample of water with a hardness of ten grains per gallon can be reduced in ten minutes. Thus a 10 x 10 ft. softener would be suitable to handle 10,000 gallons of water per hour, having a hardness of ten grains per gallon. The space required for the softener is comparatively small and it can be easily installed in the boiler room.

Unlike the other methods of softening water, the process is automatic. No chemicals are to be added or regulated. As the water passes through the bed of zeolite the hardness is reduced to nil. The zeolite is insoluble and the possibility of having an excess of reägent is obviated. Of course, it sometimes happens that careless operators overload the softener and the water comes through with some hardness.

Another factor to be considered is that of foaming. It is true that the higher percentage of sodium salts which may be in zeolite treated water may have a tendency to cause foaming. In the treatment of water in the zeolite softener the absence of all suspended scale, mud and

The only oil burner that retains the natural functions of a coal boiler.

The ABC horizontal circular flame heats the water legs of the boiler—the same place the boiler was designed to be heated by a coal fire.

What is the result?

1. Quicker heat.
2. Longer boiler life.
3. More heat absorbed by boiler due to absence of unnatural draughts. No roaring fan blows heat up the chimney.
4. Less oil required.

The modern oil burner—ABC—appeals to all. Today write for details on an exclusive ABC agency.

Automatic Burner Corporation
312 North May Street CHICAGO

sludge is assured and this reduces the tendency of the large amounts of sodium salts to foam. Of course, the proper blowing of boilers will also make this trouble very uncommon.

In the case of sand it is often advisable to use the softener in connection with a sand filter to remove foreign matter. If excessive amounts of mud are allowed to enter the boiler, a great deal of trouble will accrue from the deposition of large amounts of deposit where the circulation of water is sluggish. In the case of boiler compound treating or the lime soda precipitating process, the formation of sludge within the boiler is something that will add to the harmful effects of large deposits on the tubes or in parts of the boiler where the circulation is poor. And in many cases the losses from sludge deposition are greater than that produced by scale.

Another menace to be considered in feed water is its corrosive property. Where corrosion is due to the presence of agencies that produce electrolytic currents, or to dissolved oxygen, or acidity, other methods than water softening are to be pursued. However, these cases are, fortunately, rather uncommon, and are the exception rather than the rule.

It is obvious that the reduction of scale, foaming, and priming can be accomplished with adequate water softening and the boiler operator can well consider that loss from a poor water supply will not only boost the fuel bill but will introduce elements of danger in the operation of the plant.

Pumps
Air—Oil—Vacuum—Transfer
Positive Pumps at
Production Prices.
FOR DOMESTIC OIL BURNERS
Belt drive or direct connected
Transfer pumps, hand driven.
Complete compression units.
Superior Pump Co.
223 W. Fort St., Detroit, Mich.

Aeroil Burner Co., Inc.
Union Hill, N. J.
Manufacturers of
Kerosene Thawing Outfits
Flame Concrete Heaters
Portable Water Heaters
"Smokeless" Asphalt Kettles
Portable Oil Burners and Torches
Lead Melting Furnaces
AGENTS WANTED

John C. Hornung
Consulting Engineer
25 Years Experience in Combustion and Control
343 So. Dearborn St.
Chicago

Dealers! Manufacturers!
Arm your salesmen with copies of
SALESTAUX
A collection of six articles on the "how" and "why" of salesmanship, prepared by a successful, nationally known sales promotion expert. It is filled with practical, worthwhile information that will be a great aid when you plan your summer selling program.
Price—40 cents each
Check or stamps to accompany order.
FUEL OIL for Heat and Power
350 Madison Ave., New York City

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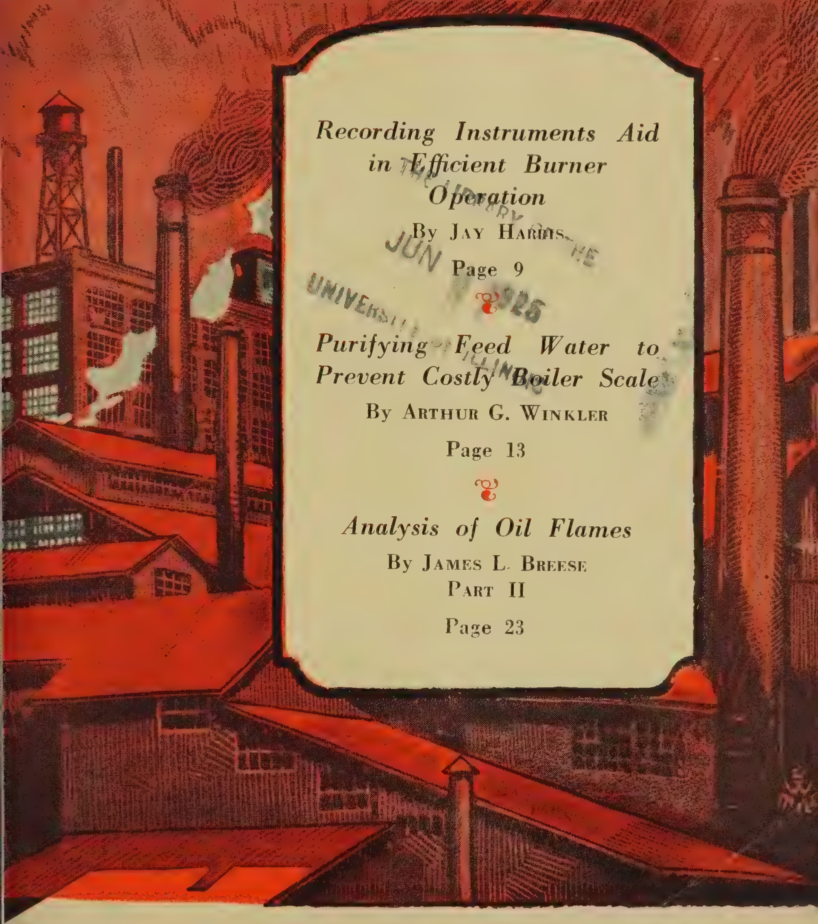
FUEL OIL

FOR HEAT and POWER



Recording Instruments Aid in Efficient Burner Operation

By Jay Harris

Page 9

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UNIVERSITY OF ILLINOIS

Purifying Feed Water to Prevent Costly Boiler Scale

By Arthur G. Winkler

Page 13

Analysis of Oil Flames

By James L. Breese

Part II

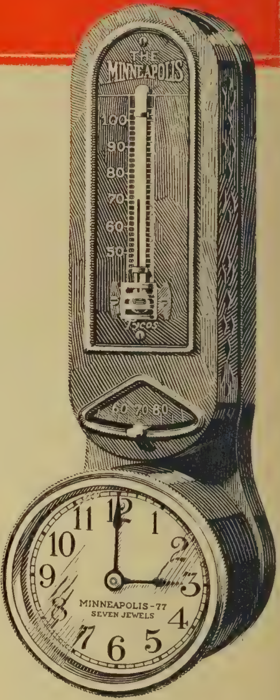
Page 23

Vol. III June, 1925 No. 12

THE convenience of oil burner heating reaches the highest development in the Minneapolis 8-day clock thermostat. Point out to oil burner buyers how this masterful clock automatically lowers the temperature at night and raises it in the morning at any predetermined time. Here is added convenience of tremendous sales importance.

Complete information on Minneapolis Controls sent on request.

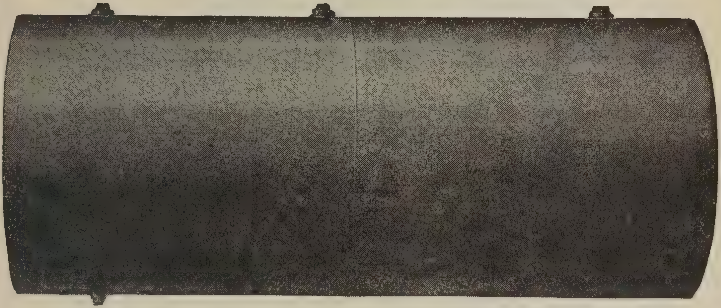
MINNEAPOLIS HEAT REGULATOR CO.
Established 1885
2920 Fourth Ave. So.,
Minneapolis, Minn.



Model 77
8 Day—7 Jewels

The "MINNEAPOLIS" HEAT REGULATOR

TRADE Leader MARK



The Logical Tank

For the Dealer Who Cares

If the burner is right and the tank is right then every installation will render quiet testimony to the integrity of the dealer who installed it.

Leader builds and guarantees quality tanks for every burner need. Of the thousands of tanks shipped out for burner use not one has ever come back.

Measuring gauges, vents, fill pipes, etc., are a part of our complete line.

Your order will be shipped immediately from stock.

Send for Special Bulletin and Price List No. 11

LEADER IRON WORKS, *Decatur, Illinois*
2118 N. JASPER ST.

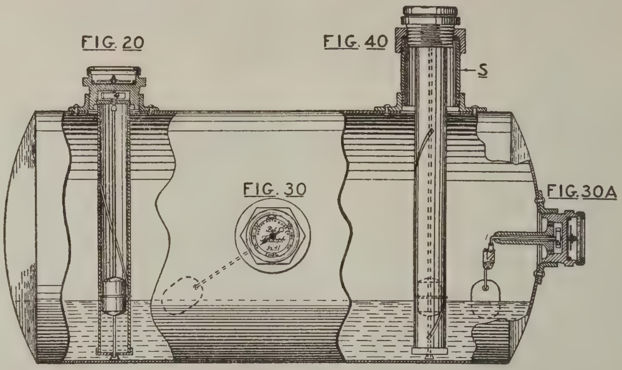


Fig. 20, Triumph No. 26 O. B. Upright gage, shown in section.

Fig. 30, Triumph Jr., No. 41 gage, applied to side of tank.

Fig. 40, Adaptation of Triumph No. 26 O. B. gage for storage tanks buried underground.

Fig. 30A, Triumph Jr., No. 41 gage shown in section, applied to dome end of tank.

"*Triumph*"

Magnetic Oil Tank Gages

are

Durable—Dependable—Safe

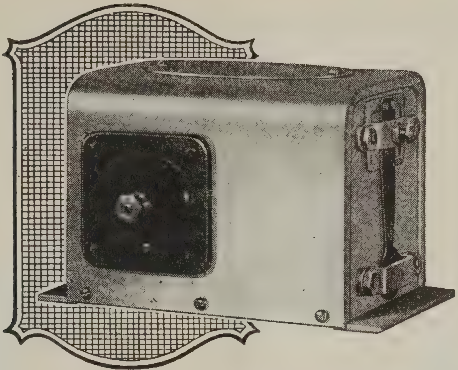
The indicating pointer on all models of the "Triumph" is a compass needle which is revolved by the turning of a magnet under a solid diaphragm. This makes the gage absolutely safe for use below the level of the fluid, for even if the glass becomes broken there is no opportunity for either the fluid or fumes to escape.

An actual test by the Underwriters' Laboratories showed that a pressure of 1500 pounds was necessary to cause a rupture of the diaphragm.

Eighteen years of gage manufacturing experience have gone into the perfection of this gage.

Write for details of Model Jr. No. 41 and Model 26 O. B., which are special designs for oil burning equipment and are listed as standard by the Underwriters' Laboratories.

The Boston Auto Gage Company
28 Clapp Ave. Pittsfield, Massachusetts



Six Long-Sought Features

- Low Current Consumption
- Low Voltage, Non-Arcing Vibrator Points
- Low Temperature Rise
- No Transformer
- Absolute Safety
- Freedom from Frequent Servicing

THE Webster Oil Burner Coil brings to oil burner manufacturers the definite and permanent solution of their ignition problems. ¶ It combines in one, simple, compact, highly efficient unit six distinct, long-sought features, and thereby provides a degree of dependable performance heretofore unattainable in any existing device. ¶ A number of the largest and most progressive manufacturers have already adopted this coil. Others are proving, by tests, the claims made for it. The Webster engineering staff is ready and willing to work with additional oil burner manufacturers to this same end.

WEBSTER ELECTRIC CO., Racine, Wis.

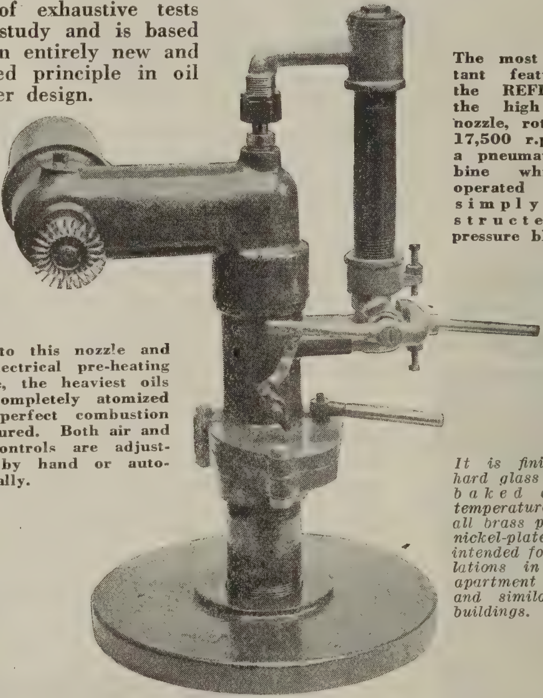
Webster
Oil Burner Coil

The New

REFLEX

OIL BURNER

This burner is the product of exhaustive tests and study and is based on an entirely new and proved principle in oil burner design.



The most important feature of the REFLEX is the high speed nozzle, rotated at 17,500 r.p.m. by a pneumatic turbine which is operated by a simply constructed low pressure blower.

Due to this nozzle and an electrical pre-heating device, the heaviest oils are completely atomized and perfect combustion is assured. Both air and oil controls are adjustable by hand or automatically.

It is finished in hard glass enamel, baked at high temperatures and all brass parts are nickel-plated. It is intended for installations in hotels, apartment houses and similar sized buildings.

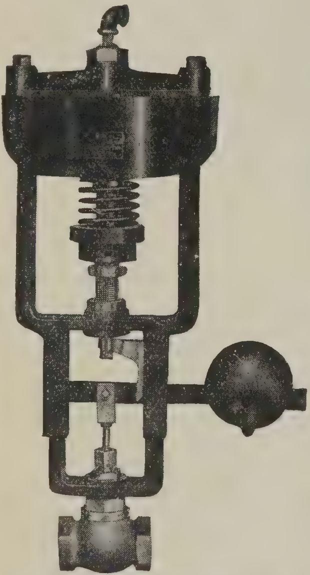
Dealers:

Here is an opportunity to handle a large burner that will give your customers completely satisfactory service. Remember that the larger the installation, the larger the profit. Your busy season is about to begin. Write today for details of our offer.

Simplex Oil Heating Company

87 Broadway Providence, R. I.

If atomizing pressure fails—this valve clamps down like a vise—
saves oil and fire risk



This new No. 955 Sylphon Interlocking Valve is unconditionally approved by the Associated Factory Mutual Fire Insurance Companies. Standardize on Sylphon for oil burning safety.

Made in valve sizes from ½" to 2½" inclusive, these NEW Sylphon Interlocking Valves will in different sizes handle up to 125 lbs. oil pressure.

Just install one in the fuel line. Then the pressure of the atomizing supply will be admitted to the Sylphon bellows chamber through the ¼" pipe connection at the top and will hold the valve open as long as the atomizing pressure is at the required minimum.

If pressure fails, valve trips and cuts off fuel supply, preventing flooding of furnaces and danger of fire.

The Sylphon bellows trips it as quick as a flash

The quickest kind of action is needed in a valve like this. Let the pressure fall so little as an ounce—the flexible seamless Sylphon bellows immediately contracts and snaps shut the valve.

Any one of our 36 national sales offices will be glad to show you this new Sylphon Interlocking Valve.

As a first step get bulletin ZIV-100

THE FULTON COMPANY

Originators and Patentees of the Sylphon Bellows

KNOXVILLE, TENNESSEE

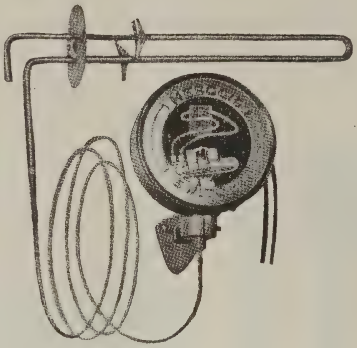
Sales Offices in

New York Chicago Detroit Boston Philadelphia

and All the Principal Cities in U. S.

European Representatives: Crosby Valve & Engineering Co., Ltd.,
41/42 Foley Street, London, W. 1., England

Canadian Representatives: Darling Bros., Ltd.,
120 Prince Street, Montreal, Canada



Federal Mercoid Furnace Control

For Installation in the Hood Above Dome of the Furnace Positive Safeguard Against Overheating with Simple Adjustment Up to 300° F.

Complete Direct Control

When Used in Series with

Federal Mercoid Thermostat

Write for Bulletin E1

MERCOIDS are listed as standard by Underwriters' Laboratories, Inc., and are manufactured only by

THE FEDERAL GAUGE COMPANY
564 WEST ADAMS STREET
CHICAGO, ILLINOIS

NEW YORK OFFICE: 25 CHURCH STREET

A nationally known manufacturer (name on request) recently wrote:

> *"We have used Ohio Motors since 1922.*
>
> *"The service on which these motors are used is 24 hours a day and 365 days a year. The continuous functioning of the motor is absolutely necessary, and regardless of price we desire as good a motor as we can obtain."*

Such reliable motor operation under all conditions is your best assurance that your motor driven device or equipment will render the satisfactory service you have built into it.

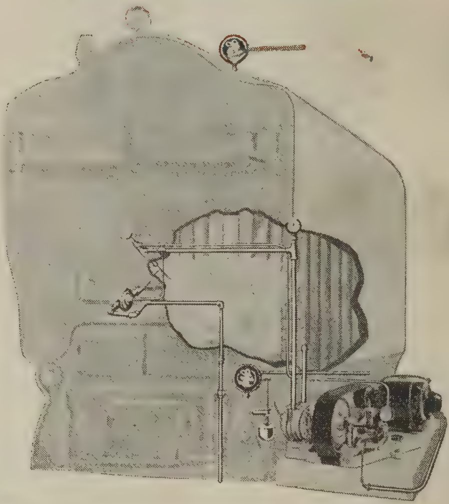
Sleeve Bearing or Ball Bearing motors to meet your specific needs.

OHIO ELECTRIC AND CONTROLLER COMPANY
5920 MAURICE AVENUE CLEVELAND, OHIO

OHIO MOTORS

MARVEL

FUEL OIL BURNER



THE MARVEL OIL BURNER is a simple mechanical device, designed to meet the ever increasing demand for a practical, economical domestic FUEL OIL burner.

MARVEL'S METHOD of atomizing the oil eliminates noise and spreads the flame over the entire heating surface of the boiler which was not built for an intensely hot condensed flame.

ATTENTION DEALERS

IF MARVEL is not represented in your territory write to us. We still have some very desirable districts open. But act quickly.

MARVEL OIL BURNER COMPANY
711 W. WASHINGTON BLVD., CHICAGO, ILL.

Thousands of Oil Burner Users

Will read this Saturday Evening Post Advertising

LIVE DEALERS—Order your "sample display" unit of this Milwaukee Automatic Fuel Oil Pump today. Get yourself in position to accept summer orders from the thousands of oil burner users who will read this advertising campaign in the Saturday Evening Post. You can increase your business and reduce your service expense by installing a "Milwaukee" motor-driven supply pump tank with every oil burner you install. WRITE US AT ONCE FOR DETAILS OF OUR ATTRACTIVE PROPOSITION.

MILWAUKEE TANK WORKS
MILWAUKEE WISCONSIN

BRANCHES

New York, St. Louis, Pittsburgh, Cleveland, Paris, Detroit, Chicago, London, Minneapolis, Rotterdam.

FUEL OIL

FUEL OIL

GAS OIL

5 *Offices*

Conveniently located to your place of business is one of the five Spencer offices.

At its head is a man whose life work has been the marketing of petroleum products.

At its command is a knowledge of oils, sources of supply and markets such as few organizations have acquired.

Guiding its operations always is the inflexible Spencer motto—cheerful, conscientious service is the foundation of success.

Seriously and sincerely, we invite you to try us out. If we DO give such unusual service that our history is an unbroken record of growth, it will be mutually advantageous to know each other better.

"Conscientious Oil Marketing, Guided by Years of Experience"

SPENCER PETROLEUM CO.

All Petroleum Products

STABILITY
SPENCER
SERVICE
OILS
SATISFACTION

CHICAGO
1331-1333 Peoples Gas Bldg.
Harrison 9630-1-2-3-4

TULSA
1039 Kennedy Bldg.
7857
Long Distance 37

KANSAS CITY
700 Orear-Leslie Bldg.
Harrison 6180-81
Long Distance 65

DETROIT
743 Book Bldg.
Cadillac 8864

WICHITA FALLS
204 City National Bank Bldg.
Phone 3480

KEROSENE

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